Adobe Premiere Pro CC

SDK Guide

Version 13.0
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Version History

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9 February 1996	Brian Andrews	Version 4.2
20 April 1998	Brian Andrews	Version 5
10 December 2000	Bruce Bullis & Eric Sanders	Version 6 release 1
10 May 2001	Bruce Bullis	Version 6 release 2
19 July 2002	Zac Lam & Bruce Bullis	Version 6.5
21 August 2003	Zac Lam	Version 1.0 (Premiere Pro)
25 May 2004	Zac Lam	Version 1.5
17 January 2006	Zac Lam	Version 2.0 release 1
13 July 2006	Zac Lam	Version 2.0 release 2
5 October 2007	Zac Lam	Version CS3
21 September 2009	Zac Lam	Version CS4
28 April 2010	Zac Lam	Version CS5
2 May 2011	Zac Lam	Version CS5.5
30 April 2012	Zac Lam	Version CS6 release 1
19 June 2012	Zac Lam	Version CS6 release 2
16 July 2013	Zac Lam	Version CC
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16 June 2014	Zac Lam	Version CC 2014
4 August 2015	Zac Lam	Version CC 2015
4 November 2016	Zac Lam	Version CC 2017
6 April 2017	Zac Lam	Version CC 2017.1
13 November 2017	Zac Lam	Version 12.0
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1 November 2018	Bruce Bullis	Version 13.0

Table of Contents

Table of Contents

1 Introduction

Welcome to the Adobe® Premiere® Pro CC Software Development Kit! This is a living document, and is constantly being updated and edited. The latest release of the SDK is available at: https://www.adobe.io/apis/creativecloud/premierepro.html.

If you have questions about the APIs described in this document, or about integration with Premiere Pro, your question may already be answered on the Premiere Pro SDK forum at: https://forums.adobe.com/community/premiere/sdk.

What Premiere Plug-ins Do

Premiere APIs provide access to many points of the video editing pipeline. Recording from an external device, device control, media import and export, video effects and transitions, playback to external hardware, and integration with control surfaces can all be performed by plug-ins.

SDK Audience

The Premiere Pro Software Development Kit enables developers to create plug-ins for Premiere Pro, After Effects, Audition, Media Encoder, Character Animator, and Premiere Elements.

The required development environment for the Premiere Pro SDK for Windows is Microsoft Visual Studio 2015 Update 3 on Windows 7 or Windows 10 64-bit. When setting up Visual Studio you may need to adjust some installation settings to install the components for compiling 64-bit plug-ins. On macOS, the minimum environment is Xcode 7.3 on macOS 10.12 or later.

The SDK includes sample projects for these development environments. On Windows, projects can often be updated to more current versions of Microsoft Visual Studio by simply opening the project and approving the automatic conversion. The sample code is written in C++. Other compilers and programming languages are not supported. We cannot assist with platform API programming issues not central to Premiere Pro plug-in programming.

If this is your first time developing a Premiere plug-in, you can skip the What's New section.
If you are developing on macOS, see a quickstart video on building a plug-in using a similar SDK (on macOS): adobe.ly/2sjMDwM
and then go directly to Where Do I Start?

What's New?

What's New in 13.0

The only significant change to Premiere Pro's C++ APIs for 13.0 is the addition of color-space specifiers to the Importer API. The ColorProfileRec structure is deprecated; instead, Importers will describe supported colorspaces (in response to imGetIndColorSpace) using a ColorSpaceRec.

What's New in 12.0

Effects and Transitions

GPU effects and transitions built using this SDK are now compatible with After Effects 15.0 and later. The sample GPU effect projects have been updated so that they load in both Premiere Pro and After Effects.

The newly provided PrGPU SDK macros and device functions allow you to write kernels that will compile on multiple GPU compute languages - OpenCL, CUDA, and Metal.

Multiple effects and transitions can now be implemented in a single plug-in binary, by defining multiple entry points in software at runtime. The new method for registering entry points will be a replacement for the PiPL resource, and is currently only supported in Premiere Pro. The sample effects and transitions demonstrate this new method, while the PiPL resource remains, for backwards-compatibility in PPro, and compatibility with AE.

Sequence Info Suite is now at version 5, adding the new call `GetImmersiveVideoVRConfiguration()`, which returns the VR video settings of the specified sequence.

New selector available for Export Info Suite: `kExportInfo_SourceBitrate`. This returns the source's bitrate in kbps, and is not available for all source types. `exParamType` can now be of type `exParamType_thumbnail`. A new flag `exParamFlag_verticalAlignment` can now be set so that property name and value controls are displayed vertically rather than side-by-side.

What's New in CC 2017.1

Importers

Importers that support captions can make use of the `mayHaveCaptions` flag in `imFileInfoRec8`, for better performance. Also, a `imImageInfoRec` is now added to *imInitiateAsyncClosedCaptionScanRec*, just for the width and height parameters.

Exporters

Exporters can advertise whether they support color profile embedding. There are also APIs to set color profile in the exporter, and a flag that controls whether profile is to be embedded. The color profile is passed to an exporter via `exDoExportRec`, for it to embed in the output media according to format standards. This is currently used for exports from After Effects through Media Encoder.

Transmit

New 10-bit and 12-bit RGB HLG formats have been added for expanded HDR support.

In App Info Suite, a new identifier has been added for Character Animator, which now supports transmit plug-ins.

VR Video Support

The Playmod Immersive Video Suite can be used to query whether or not ambisonics monitoring is on or not, in the VR Video Settings.

What's New in CC 2017

VR Video Support

Transmit plug-ins can have the VR perspective in the desktop Monitor driven by the Head-Mounted Display, so when the person with the Head-Mounted Display looks in a different direction, the desktop Monitor shows that same perspective. To do this, the transmit plug-in can use the new Playmod Immersive Video Suite to indicate that it supports tracking.

Once Premiere sees the transmitter supports tracking, when the user activates the VR viewer, the new menu item, "Track Head-Mounted Display" will become active, and can be toggled to begin tracking. The transmitter should call `NotifyDirection()` as frequently it wants with updated info. Premiere will pick up the new position on the next frame draw.

For importers, `imFileInfoRec8` has now been expanded so that if an importer detects that a clip contains VR video, it can inform Premiere.

New Sample Projects

This SDK includes a new render path for the ProcAmp sample for Metal. This sample requires macOS 10.11.4 and later.

We've also added a sample GPU effect called Vignette, donated by Bart Walczak. This effect has OpenCL, CUDA, and software render paths. Software rendering in Premiere Pro includes 8-bit/32-bit RGB/YUV software render paths. Software rendering in After Effects includes 8-bit and 32-bit smart rendering.

And lastly, the Control Surface sample is now cross-platform.

New Panel/Scripting Capabilities

Scripting, the processing underlying HTML5 panels, is consistently being improved upon. In this release, we've added scripting functions to add/modify effect keyframes. See the sample panel code on GitHub:
https://github.com/Adobe-CEP/Samples/tree/master/PProPanel
In particular, see the function `onPlayWithKeyframes()` in jsx/Premiere.jsx

Miscellaneous

In Video Segment Render Suite, new versions of various calls have been added with an additional boolean value that allows renders to skip rendering of non-intrinsic effects.

What’s New in CC 2015.4

Effects and Transitions

GPU-accelerated rendering using Metal is now supported for third-party effects and transitions. `PrGPUDeviceFramework_Metal` has been added as one of the enum values in `PrGPUDeviceFramework`.

What’s New in CC 2015.3?

Control Surfaces

New suites have been added for Control Surfaces to support the Lumetri Color panel. Most controls are supported, including the color wheels, but not including the Curves controls.

There is now a shared location for Control Surface plug-ins. On Mac:
/Library/Application Support/Adobe/Common/Plug-ins/ControlSurface, and
~/Library/Application Support/Adobe/Common/Plug-ins/ControlSurface
On Win:
C:\Program Files\Adobe\Common\Plug-ins\ControlSurface

Importers

Video duration can now be reported as a 64-bit integer, using the new `imFileInfoRec8.vidDurationInFrames`, to support longer file lengths. There is also a new suite function, `SetImporterInstanceStreamFileCount()`, for importers to specify how many files they open.

Exporters

New flags can be set in `exExporterInfoRec.flags`, to restrict an exporter from being used in a way that doesn’t make sense. Now, an exporter can specify that video-only export is not supported. Also, an exporter can turn off the Publish tab if it chooses to.

Effects

Source settings effects should use the updated Source Settings suite with new `SetIsSourceSettingsEffect()` function. They should make this call during *PF_Cmd_*

GLOBAL_SETUP. This function was added to handle the case when the effect is applied to proxy video.

Misc

Using the Sequence Info Suite, a new call has been added, `GetProxyFlag()`, for a plug-in to know whether the proxy mode is on or off.

What's New in CC 2015.1?

Transmit

Native support for 12-bit Dolby PQ pixel formats, with Rec. 709, P3, and Rec. 2020 primaries, have been added.

What's New in CC 2015?

After Effects-Style Transitions

AE-style Transitions can now get and set transition start and end percentages. The user can change the start and end parameters in the Effect Controls panel. To allow a plugin to be informed of changes to these values, there are two new functions in the PF TransitionSuite: `RegisterTransitionStartParam()` and `RegisterTransitionEndParam()`, which register these parameters with the plug-in as float parameters. Once registered, the plug-in will receive *PF_Cmd_USER_CHANGED_PARAM* when these params change, as well as when the transition is first applied, so the plug-in can initialize them to the desired value.

AE-style Transitions can now retrieve GPU frames from arbitrary locations in the underlying clips. There is a new `PrGPUDependency_TransitionInputFrame`, and `PrGPUFilterFrameDependency` has a new member to specify whether frames from the incoming or outgoing clips are needed.

Source Settings = Effect + Importer

Source Settings for clips can now be implemented using effects that are tied to importers. This has the advantage of providing settings in the Effect Controls panel, rather than in a modal dialog. Editors can adjust Source Settings for multiple clips this way. These effects are used for the DPX source settings, CinemaDNG, etc.

To implement this, an importer should set `imImportInfoRec.hasSourceSettingsEffect` to true. Then in `imFileInfoRec8`, it should set `sourceSettingsMatchName` to the match name of the effect to be used for the Source Settings.

On the effects side, a new PF Source Settings Suite has been added to PrSDKAESupport.h, for effects using the After Effects API. This is how an effect registers a function to handle the Source Settings command.

A source settings effect is used primarily for the parameter UI and management. A source settings effect doesn't provide the actual frames. In fact, the effect isn't even called with *PF_Cmd_RENDER*. The frames come directly from the importer, which provides frames based on the settings as passed to the importer via prefs data.

When a clip is first imported, the effect is called with *PF_Cmd_SEQUENCE_SETUP*. It should call `PerformSourceSettingsCommand()` in the Source Settings Suite, to initialize the prefs. This causes the importer to get called with *imPerformSourceSettingsCommand*, where it can read the file and set the default prefs. param1 of that function is `imFileAccessRec8*`, and param2 is `imSourceSettingsCommandRec*`.

When the source settings effect parameters are changed, the effect gets called with *PF_Cmd_TRANSLATE_PARAMS_TO_PREFS*. The function signature is:

```
PF_Err TranslateParamsToPrefs(
    PF_InData* in_data,
    PF_OutData* out_data,
    PF_ParamDef* params[],
    PF_TranslateParamsToPrefsExtra *extra)
```

With the new prefs, the importer will be sent *imOpenFile8, imGetInfo8, imGetIndPixelFormat, imGetPreferredFrameSize, imGetSourceVideo*, etc.

`imSourceSettingsCommandRec` and PF Source Settings Suite allow the effect to communicate directly with the importer, so that it can initialize its parameters properly, based on the source media. In the DPX source settings effect, for example, in *PF_Cmd_SEQUENCE_SETUP*, it calls `PF_SourceSettingsSuite->PerformSourceSettingsCommand()`, which calls through to the importer with the selector *imPerformSourceSettingsCommand*. Here, the importer opens the media, looks at the header and initializes the prefs based on the media. For DPX, the initial parameters and default prefs are based on the bit depth of the video. These default prefs are passed back to the effect, which sets the initial param values and stashes a copy of them in sequence_data to use again for future calls to *PF_Cmd_SEQUENCE_RESETUP*.

Importers

For any importers that are using `imClipFrameDescriptorRec`, note that the structure definition has changed. Any importers that use this in both CC 2014 and CC 2015 or later will need to do a runtime check before accessing the members of this structure.

Exporters

Exporters can now use standard parameters for audio channel configuration, as used with the built-in QuickTime exporter. The new exporter parameters ADBEAudioChannelConfigurationGroup and ADBEAudioChannelConfiguration supercede ADBEAudioNumChannels. The new Export Audio Param Suite can be used to query/change the audio channel configuration. The Sequence Audio Suite is now at version 2, revising `MakeAudioRenderer()` to take `PrAudioChannelLabel*` as a parameter.

Transmitters

Transmitters can get a few new bits of information to aid with A/V sync. In the Playmod Audio Suite, the new function `GetNextAudioBuffer2()` returns the actual time the rendered buffer is from. Also, in `tmPlaybackClock`, the new members `inAudioOffset` and `inVideoOffset` have been added to specify the offset chosen by the user in the preferences. The host accounts for these offsets automatically by sending frames early, but if a transmitter is manually trying to line up audio and video times, it can use this to know how far apart from each other they are supposed to be.

Miscellaneous

Legacy callbacks `bottlenecks->ConvolvePtr()` and `IndexMapPtr()` have had their parameter types updated to fix a bug. Any plug-ins that use these in both previous versions and CC 2015 will need to do a runtime check before calling this function.

Starting in CC 2015, we now provide installer hints for Mac. You'll find a new plist file "com.Adobe.Premiere Pro.paths.plist" at "/Library/Preferences". This contains hints for your Mac installer to know where to install plug-ins, and is similar to the registry entries we have been providing on Win.

New Sample Projects

This SDK includes updated GPU effect and transition samples that demonstrate GPU rendering. Thanks to Rama Hoetzlein from nVidia for the CUDA render path provided for the SDK_CrossDissolve sample!

A barebones Control Surface sample is now provided, too.

What's New in CC 2014 (8.2)?

Importers now have more visibility into the player's intent on a given async request, since the render context info is now passed in `imSourceVideoRec.inRenderContext`. Async importers can implement *aiSelectEfficientRenderTime* to specify if a frame request would be more efficient at another frame time, for example at I-frame boundaries. The Video Segment Render Suite has been updated to version 4, adding new calls that include `imRenderContext` as a parameter.

What's New in CC 2014 (8.1)?

Importers that support growing files now get a hint if the host knows the file has stopped growing: `imFileInfoRec8.ignoreGrowing`.

Exporters can now get the list of source pixel formats used by the clips in a sequence that is being smart rendered. `GetExportSourceInfo(..., kExportInfo_SourcePixelFormat, ...)` provides this information.

What's New in CC 2014 (8.0.1)?

Importers can fill in `imImageInfoRec.codecDescription` to provide a string that will be displayed for clips in the Video Codec column of the Project panel.

What's New in CC 2014?

Importers can now choose the format they are rendering in, which allows importers to change pixel formats and quality based on criteria like enabled hardware and other source settings, such as HDR. To handle the negotiation, implement *imSelectClipFrameDescriptor*.

`imSourceVideoRec` now includes a quality attribute. PPix Cache Suite is now at version 6, adding `AddFrameToCacheWithColorProfile2()` and `GetFrameFromCacheWithColorProfile2()`, which are the same as the ones added in version 5 with the addition of a `PrRenderQuality` parameter.

`imFileInfoRec8.highMemUsage` is no longer supported.

A new recorder return code was added, `rmRequiresRoyaltyContent`. Return this from `recmod_Startup8` or `recmod_StartRecord`, if the codec used is unlicensed.

OpenCL rendering now also uses the half-precision 16-bit floating point pixel format for rendering. GPU effects and transitions that support OpenCL should implement both 16f and 32f rendering.

A new plug-in API has been introduced for hardware Control Surfaces. This is the API that allows support for EUCON and Mackie devices to control audio mixing and basic transport controls. The API supports two-way communication with Premiere Pro, so that hardware faders, VU meters, etc are in sync with the application.

Premiere Pro is now localized in Russian and Brazilian Portugese.

What's New in CC October 2013?

We've extended the After Effects API to support native transitions in Premiere Pro.

For device controllers, the new command *cmdSetDeviceHandler* was added. This command tells the device controller which panel is using the device controller -- either the Capture panel, or Export to Tape panel.

For importers, `imInitiateAsyncClosedCaptionScanRec` now provides extra fields for the importer to fill in the estimated duration of all the captions. This is useful for certain cases where the embedded captions contain many frames of empty data.

We added version 2 of the Export File Suite to resolve a mismatch in seek modes.

What's New in CC July 2013?

The only significant additions made in the July 2013 update to version CC are in the device controller API.

What's New in CC?

New Edit to Tape Panel

You can think of this as the Export to Tape equivalent of the Capture panel for capturing, which provides a video preview and various settings in the PPro UI. Among the benefits are more seamless integration, a more familiar UI for users, integrated device presets, and some new capabilities like adding Bars and Tone / Black Video / Universal Counting Leader to the start of your layoff to tape. To use this new feature, read more about what's new in the device controller API.

New GPU Extensions for Effects and Transitions

New GPU Extensions to existing APIs allow effects and transitions to access video frames in GPU memory, when using the Mercury Playback Engine in a GPU-accelerated mode. See the new GPU Effects and Transitions chapter for more information.

Closed Captioning Support in Importer and Exporter APIs

The importer and exporter APIs have been extended to support closed captioning embedded in media. Note that Premiere Pro can also import and export captions in a sidecar file (e.g. .mcc, .scc, or .xml) alongside any media file, regardless of the media file format.

Miscellaneous Improvements

- A new pixel format for native 10-bit RGB support - `PrPixelFormat_RGB_444_10u`, as well as `PrPixelFormat_UYVY_422_32f_*` formats
- VST 3 support allows many more audio plug-ins to run in Premiere Pro
- Windows installer improvements, by adding new registry values for preset and settings locations.
- Get the current build number via the App Info Suite
- Importers can now support audio beyond basic mono, stereo, and 5.1, without implementing multiple streams, and importers can return varying pixel formats depending on the clip settings. Read more about what's new for importers.
- Exporters can get the number of audio channels in the source, and check if the user has checked "Use Previews" in the Export Settings dialog. They can also move an existing settings parameter to a different location. Read more about what's new for exporters.
- The Sequence Info Suite can retrieve the field type, zero point, and whether or not the timecode is drop-frame
- New flags to the transition API as a hint to optimize rendering when a transition only has an input on one side
- The Video Segment Suite provides access to a new property: `Effect_ClipName`

Premiere Pro is now localized in Chinese.

What's New in CS6.0.x?

CS6.0.2 adds more support for growing files in importers. A transmitter can now label its audio channels for the Audio Output Mapping preferences.

CS6.0.1 gives device controllers a way to get the number of frames dropped during an insert edit, to abort an Export to Tape if desired. This method is already superceded by the new Edit to Tape panel functionality in CC.

What's New in CS6?

Transmit API

We are introducing the Transmit API as the preferred means for external hardware monitoring. This new API provides vastly simplified support for monitoring on external hardware. Transmit plug-ins offer more flexible usage, since they are not tied to the sequence Editing Mode, which cannot be changed once a sequence has been edited. Transmitters can be specified by the user in Preferences > Playback. Other plug-ins such as importers and effects with settings preview dialogs can send video out to the active transmitter, opening up new possibilities for hardware monitoring. For this first release, transmit plug-ins are supported in Premiere Pro, Encore, and Prelude. Not far down the road, we intend to stop supporting the player API, but we will continue to support it for CS6. See the transmitters chapter for more details.

Exporter Enhancements

Exporters can now use "push" model compression. This can simplify export code and improve performance. The "pull" model is still supported, and required for legacy versions and Encore.

We've added the Export Standard Param Suite, which provides the standard parameters used in many built-in exporters. This can greatly reduce the amount of code needed to manage standard parameters for a typical exporter, and guarantee consistency with built-in exporters.

Exporters can now set tooltip strings for parameters. Multiple exporters are now supported in a single plug-in. And the Maximum Render Precision flag is now queried from the exporter, rather than being handled without the exporter's knowledge.

Exporters can now set events (error, warning, or info) for a specific encode in progress in the Adobe Media Encoder render queue, using the new Exporter Utility Suite. These events are displayed in the application UI, and are also added to the AME encoding log.

Make sure your presets go in the right location in the new AME Preset Browser.

Read additional details of what's new in the exporters chapter.

Stereoscopic Video Pipeline

We are also adding API support for stereoscopic video throughout the render pipeline. This affects importers, effects built using the After Effects API, and exporters.

Other Changes

Importers can now support growing files in Premiere Pro. We have also added a way for importers to specify all their source files to be copied by Collect Files in After Effects. There is also a new function in the Media Accelerator Suite to validate the content state of a media accelerator. See additional details of what's new in the importers chapter.

For ***Recorders***, the parent window handle is now properly passed in during *recmod_ShowOptions* when a recorder should display its modal setup dialog.

For ***Players***, `pmPlayerSettings` has a new member, `mPrimaryDisplayFullScreen`, which indicates whether or not the player should display fullscreen.

Device controllers have a new callback, `DroppedFrameProc`, to provide the feature to abort and Export to Tape if frames are dropped.

New video segment properties were added: `kVideoSegmentProperty_Media_ClipScaleToFramePolicy`, `kVideoSegmentProperty_Adjustment_AdjustmentMediaIsOpaque`, `kVideoSegmentProperty_Adjustment_OperatorsHash`, `kVideoSegmentProperty_Media_InPointMediaTimeAsTicks`, `kVideoSegmentProperty_Media_OutPointMediaTimeAsTicks`, `kVideoSegmentProperty_Clip_TrackItemStartAsTicks`, `kVideoSegmentProperty_Clip_TrackItemEndAsTicks`, `kVideoSegmentProperty_Clip_EffectiveTrackItemStartAsTicks`, and `kVideoSegmentProperty_Clip_EffectiveTrackItemEndAsTicks`.

The Memory Manager Suite is now at version 4. `AdjustReservedMemorySize` provides a way to adjust the reserved memory size relative to the current size. This may be easier for the plug-in, rather than maintaining the absolute memory usage and updating it using the older `ReserveMemory` call.

MPEG-4 pixel formats and full-range Rec. 709 MPEG-2 and MPEG-4 formats have now been added for native support in the render pipeline.

What's New in CS5.5?

Importers can now support color management, when running in After Effects. Now, even non-synthetic importers can explicitly provide peak audio data. And a new return value allows an importer to specify that it is dependent on a library that needs to be activated. See additional details of what's new in the importers chapter.

Players can now support closed captioning. See additional details of what's new in the players chapter.

Exporters now have a call to request a rendered frame and then conform it to a specific pixel format. See additional details of what's new in the exporters chapter.

We have opened up a new ***Export Controller*** API that can drive any exporter to output a file in any format and perform custom post-processing operations. Developers wanting to integrate Premiere Pro with an asset management system will want to use this API instead of the exporter API. See the export controllers chapter for more details.

A new pair of pixel formats was added to natively support full-range Rec. 601 4:2:0 YUV planar video, both progressive and interlaced: `PrPixelFormat_YUV_420_MPEG2_FRAME_PICTURE_PLANAR_8u_601_FullRange` and `PrPixelFormat_YUV_420_MPEG2_FIELD_PICTURE_PLANAR_8u_601_FullRange`.

The Video Segment Suite now provides a new call to retrieve a segment node for a requested time. There are also a few new properties for media nodes: `StreamIsContinuousTime`, `ColorProfileName`, `ColorProfileData`, and `ScanlineOffsetToImproveVerticalCentering`.

The Sequence Info Suite now provides a call to get the sequence frame rate, which may be useful for effects.

The Image Processing Suite has a new call to set the aspect ratio flag of a DV frame.

What's New in CS5?

Importers now have access to the resolution, pixel aspect ratio, timebase, and audio sample rate of the source clip from a setup dialog. Custom importers can use a new call to update a clip after it has modified by the user in the setup dialog. Please refer to the Importers chapter for more info on what's new.

Recorders can now provide audio metering during preview and capture. Read more about what's new in the Recorders chapter.

Exporters and ***players*** can automatically take advantage of GPU acceleration, if available on the end-user's system. Each project now has a setting for the renderer that the user can choose in the project settings dialog. When renders occur through the Sequence Render Suite or the Playmod Render Suite, they now go through the renderer chosen for the current project. This allows third-party exporters and players to use the built-in GPU acceleration available in the new Mercury Playback Engine.

Exporters and players can now handle any pixel format, with the new Image Processing Suite. Exporters and players that parse segments and perform their own rendering can now call the host for subtree rendering. See the Video Segment Render Suite for details.

If you provide an installer for an exporter, note that custom presets created in Premiere Pro are now visible in AME and vice-versa.

Encore CS5

3rd-party exporters can now be used to transcode assets to MPEG-2 or Blu-ray compliant files. Please refer to the Guidelines for Exporters in Encore for instructions on how to set up your exporter so that Encore can use it for transcoding.

Mac 64-Bit and Cocoa

It is invalid to unload any bundle that uses Cocoa because of restrictions in the Objective-C runtime which do not support unregistering classes. If a plugin uses Cocoa, it must call CFRetain on its own bundle, otherwise it will cause a crash when the application is closing and tries to unload the plug-ins.

What's New in CS4?

New Renderer API and Custom Pixel Formats

The new renderer API provides a way to take over and accelerate rendering of segments. Just as a player can choose which segments to accelerate, so a renderer can choose which segments to accelerate. Renderers may accelerate any segment, in any sequence, in any project.

Renderers also provide a way to add completely custom pixel formats to the render pipeline. Supporting a custom pixel format in an importer, a renderer, and an exporter is the new way to implement smart rendering, by passing custom compressed data from input to output.

Sequence Preview Formats

Sequence preview file formats are now defined by Sequence encoder preset files. Without any presets installed, you will not be able to create a new sequence using your custom editing mode.

Separate Processes During Export

When choosing export settings, the settings UI is displayed by Premiere Pro. When the user confirms the settings, the clip or sequence is passed to Media Encoder. From Media Encoder, frames from the clip or sequence can be retrieved and rendered without further participation from Premiere Pro. For a clip export, Media Encoder uses any installed importers to get source frames. For sequence export, Media Encoder uses a process called PProHeadless, to import and render frames to be exported.

Since there are so many processes involved during export, it is important that plug-ins be accessible to all processes, by being installed in the common plug-ins folder. PProHeadless Plugin Loading.log provides information on the PProHeadless process. PProHeadless is also used when the user creates a dynamic link to a .prproj that is not opened in Premiere Pro.

XMP metadata

There are built-in XMP metadata handlers for known filetypes. These handlers write and read metadata to and from the file, without going through the importer. *imSetTimeInfo8* is no longer called, since this is set by the XMP handler for that filetype.

More Pixel Format Flexibility

Effects, transitions, and exporters no longer need to support 8-bit RGB at a minimum. So, for example, an effect can be written to process floating point YUV only. If necessary, Premiere will make an intermediate conversion so that the effect will receive the pixel format it supports.

Legacy API

Legacy API features, such as selectors and callbacks that are superceded by new ones, are deprecated, but are supported, unless indicated.

Where Do I Start?

Read about the sample projects. Decide which one is closest to the functionality you want to provide. Build the plug-in into the shared plug-ins folder. Launch Premiere Pro with the debugger attached, and set breakpoints at the plug-in's entry point to see all communication between Premiere Pro and the plug-in. The documentation is intended as a reference with detailed explanation where appropriate, but studying the interaction between Premiere Pro and plug-ins is the best way to understand it.

Write plug-ins by modifying sample plug-in source code. This will greatly simplify your efforts, and make it easier for us to help you. Feel free to explore and experiment with the API on your own once you're familiar with it, but please, resist the temptation to start from scratch; you'll only force yourself to repeat other developers' mistakes, including our own.

If you run into behavior that seems wrong, see if you can reproduce the behavior using one of the unmodified sample projects. This can save you a lot of time, if you can determine whether the bug behavior was introduced by your modifications, or was already there to begin with.

Document Overview

This introduction information is common to all the plug-in types. All developers should read this chapter, and browse through chapters two and three before diving too deep into plug-in development.

Chapter 2 is a short chapter that describes the Premiere Pro-specific resources used by plug-ins, including the Plug-in Property List (PiPL).

Chapter 3, Universals, documents concepts, data types, and structures used throughout the APIs. It also describes suites and functions used by more than one type of plug-in.

Chapter 4 introduces Media Abstraction, used by hardware integrators and software developers to integrate with Premiere and accelerate specific workflows.

The remainder of the document describes specific plug-in types.

This document is designed to be read non-linearly. You can browse through the topics from the bookmarks that appear in the left-hand panel in Acrobat, or the right-hand panel in the Preview application on macOS. A simple search for a well-chosen keyword will also turn up much information on any given topic.

Documentation Conventions

Functions, structure names and general C/C++ code are in `Courier`;
`MyStruct.member` and `MyFunction()`
Underlined text in light blue is hyperlinked.
Premiere selectors are italicized; *imGetPrefs*.

Getting Support and Providing Feedback

Please read relevant sections of this document and view the included sample code before requesting assistance. Please direct questions regarding installation, configuration, or use of Adobe products to Adobe Technical Support.

Having a solid understanding of digital video concepts is vital to developing plug-ins. This documentation assumes you understand basic video topics such as resolution, frame rates, field interlacing, pixel aspect ratio, bit depth, timecode, compression, color spaces, etc. You must also understand how your plug-in will fit into a user's workflow in Premiere Pro. If you aren't yet familiar with Premiere Pro or video editing concepts, we recommend the Adobe Premiere Pro Classroom in a Book.

To report a bug or submit a feature request for Premiere Pro, please visit:
http://www.adobe.com/products/wishform.html
Since this form can be used to submit bugs and features for all Adobe products, make sure you have the right product selected.

We encourage you to use the Premiere Pro SDK forum to ask questions on the API and general integration. For development questions that you'd rather keep confidential, you may contact API Engineering directly. Your feedback can improve the API and SDK to streamline future development.

Premiere Pro Plug-in Types

Importers	Import video and audio media into Premiere. Synthetic importers, a subset, dynamically synthesize media without creating an actual file on disk. Custom importers, dynamically synthesize media to disk.
Recorders	Records from a (usually hardware) source to disk. If necessary, provides a plug-in-defined settings dialog. Displays the video overlay in the preview area of the Capture panel. Any audio preview should be played directly be the recorder. The captured file is passed to Premiere after capture by its file path. The recorder can optionally provide the timecode of the captured file to Premiere Pro.
Export Controllers	Can drive any exporter to generate a file in any format and perform custom post-processing operations. Developers wanting to integrate Premiere Pro with an asset management system will want to use this API instead of the exporter API.
Exporters	Allows the user to output media to disk.
Transmitters	Sends video, audio, and closed captioning to any external device during playback and editing.

Video Filters	***We strongly recommend using the After Effects SDK to develop effects plug-ins. Most of the effects included in Premiere Pro are After Effects plug-ins.*** Process a series of video frames with parameters that can be animated over time.
Video Transitions	Process two video sources into a single destination over time. This API is based on the After Effects API, with certain functions to enable transition functionality in Premiere Pro.
Device Controllers	Control an external device (video tape recorder, camera, etc.) during Capture and Edit To Tape.
Control Surfaces	Interface with a hardware control surface to support audio mixing, basic transport controls, and the Lumetri Color panel. The API supports two-way communication with Premiere Pro, so that motorized hardware faders, VU meters, etc can be in sync with the application.
Other supported plug-in standards	
Adobe After Effects API	Premiere Pro supports a portion of the AE API. The After Effects SDK is not included in the Premiere Pro SDK. The last chapter in the After Effects SDK Guide.pdf, included in the After Effects SDK, contains information on known differences with how Premiere Pro supports the AE API.
VST	Starting in CC, Premiere supports version 3 of the VST specification for audio effects. In CS6.x and previous versions, support was limited to version 2.4.
ASIO	An ASIO driver is often provided in addition to a transmit plug-in, to provide audio output during editing, playback, and Export To Tape. Prior to CS6, an ASIO driver was required to support audio input for voiceover recording in the audio mixer. On macOS, a Core Audio component may be provided rather than an ASIO driver.
Core Audio	macOS only. May be provided instead of an ASIO driver.

Plug-in Support Across Adobe Video and Audio Applications

This chart shows which third-party plug-ins are supported by the various Video and Audio applications.

	Premiere Pro	After Effects	Media Encoder	Audition	Character Animator	Prelude
After Effects AEGPs		X				
After Effects effects	X	X				
After Effects transitions	X					
ASIO	X	X		X		X
Control Surfaces	X			X		

	Premiere Pro	After Effects	Media Encoder	Audition	Character Animator	Prelude
CoreAudio	X	X		X		X
Premiere device controllers	X					
Premiere export controllers	X					
Premiere exporters	X	X	X	X		
Premiere importers	X	X	X	X		X
Premiere recorders	X					
Premiere transmitters	X	X			X	X
Premiere video filters	X					
QuickTime codecs	X	X	X	X		X
Transitions	X					
VfW codecs	X	X	X	X		X
VST audio effects	X			X		

Encore can use third-party exporters to transcode assets to MPEG-2 or Blu-ray compliant files. Please refer to the Guidelines for Exporters in Encore for instructions on how to set up your exporter so that Encore can use it for transcoding.

Premiere Elements Plug-in Support

Premiere Elements uses the same core libraries for plug-in support that Premiere Pro does, although Premiere Elements is 32-bit, whereas Premiere Pro is 64-bit starting with CS5.

Premiere Elements version	Equivalent Premiere Pro API version
12	CS6
11	CS5.5
10	CS5.5
9	CS5
8	CS4

It’s always important to test the plug-in fully in each application before advertising compatibility. Check out the Guidelines for Exporters in Premiere Elements for instructions on how to set up your exporter to be used in Premiere Elements.

What Exactly Is a Premiere Plug-in?

Premiere plug-ins contain a single entry point of a type specific to each API. Plug-ins are DLLs on Windows, and Carbon or Cocoa Bundles on macOS. Plug-ins in the \Plug-ins\[language] folder, and any of its subfolders, will be loaded at launch. Plug-ins can have private resources. Only one plug-in per file is parsed, unlike After Effects and Photoshop plug-ins, which can contain multiple entry points.

Sample Projects

Descriptions

Name	Description
SDK File Importer	This importer supports .sdk media files. To use the importer, choose File > Import, and select an .sdk file. Such files may be created using the SDK Exporter. It supports uncompressed 8-bit RGB with or without alpha, and packed 10-bit YUV (v410). It supports mono, stereo, and 5.1 audio at arbitrary sample rates and 32-bit float. It supports trimming using the Project Manager, Properties and Data Rate Analysis, Unicode filenames, the avoidAudioConform flag, and can read video frames asynchronously. It also features a test harness for multistream audio, which can be turned on by uncommenting the MULTISTREAM_AUDIO_TESTING define in the header.
Synth Import	This synthetic importer generates 8-bit YUV and RGB, video only. To use it, choose File > New > SDK Synthetic Importer. When the clip is created, it demonstrates a sample settings dialog, which can be displayed again by double-clicking the clip in the Project Panel or Timeline Panel. Every time the settings dialog is displayed, it creates new footage in memory. It creates ten seconds of footage at 24 fps. The video consists of horizontal lines of random colors. No file is created on disk - for an example of that, see the Custom Importer.
SDK Custom Import	This custom importer creates a clip similar to the Synth Import sample, but generates it to disk, rather than memory. To use it, choose File > New > SDK Custom Importer. Or, import an existing .sdkc clip from the File > Import dialog. On Windows, newly generated files with .sdkc file extensions are created in C:\Windows\Temp\. On macOS, they are created on the Desktop. After the sample settings dialog, it optionally displays a background frame from the timeline (useful for titlers). The generated footage is between 2 and 30 frames at 24 fps, with a random resolution between 32 and 720 pixels wide and between 32 and 480 high, at DV NTSC pixel aspect ratio.

Record	This recorder pretends to capture .sdk files. To select it, choose Project > Project Settings > Capture > Capture Format: SDK Record. To simulate a capture, there must be a valid .sdk file at C:\premiere.sdk, and the SDK File Importer must also be installed. When the record button is pressed, a capture is simulated, and when capture is finished, the file at C:\premiere.sdk is copied to the file specified in the Save Captured File dialog, and automatically imported into the project. It demonstrates a simple implementation of two capture options buttons, audio capture settings directly in the Project Settings > Capture panel, Unicode filenames, and changing the capture format mid-stream.
ExportController	Adds a new menu item to File > Export > SDK Export Controller. When selected, it displays a simple message box on Windows, takes the DV NTSC widescreen preset, and exports a file to C:\Windows\Temp on Windows, or to the Desktop on macOS.
SDK Exporter	This exporter writes .sdk files. To use it, choose File > Export > Media, and in the Export Settings choose File Type: SDK File. It supports uncompressed 8-bit RGB with or without alpha, and packed 10-bit YUV (v410). It supports mono, stereo, and 5.1 audio at arbitrary sample rates and 32-bit float. It demonstrates custom parameters, including a custom settings button. It also writes marker data to an .html file with the same filename. To write files with v410 compression using 8-bit RGB sources, this sample uses routines to convert the 8-bit RGB data to 32-bit RGB, then to 32-bit YUV, and finally to v410. These same routines may be adapted for transitions, filters, and other plug-in types.
Transmitter	The sample transmit plug-in does not output to any hardware, but can be used to step through interactions between the host and plug-in in the debugger. To use it, go the the Preferences > Playback, and choose the SDK Transmitter as the Audio Device, and as a Video Device. This transmit plug-in provides the basic structure, separating concepts of plug-in and instance. For video, it declares support for any pixel format and resolution. For audio, it declares support for 2 channels. It also declares a small latency value for demonstrative purposes. On Windows, there is some basic debug logging. It does not actually provide it's own clock at this time, but on playback it simply pretends to step forward a frame with every frame received. This may result in some bug behavior such as playing back at speeds faster or slower than normal, depending on how fast the host can push frames.

Simple Video Filter	This video filter is found in the SDK folder of the Video Effects in the Effects Control panel. It has a color picker parameter and slider parameter in the Effects Control panel, and modifies the source pixels based on the parameters. If the slider is zero, the filter adds the RGB values in the color picker to the RGB values of each pixel and preserves the alpha. If the slider is non-zero, the filter uses the callback to get the current frame. Using the callback for this purpose is purely for demonstration purposes. The current frame is passed in through `(*theData)->source` and using the callback to get the current frame in a real filter is only wasting time!
Field-Aware Video Filter	This video filter is found in the SDK folder of the Video Effects in the Effects Control panel. It supports 8-bit YUV and RGB. It has a color picker parameter, a slider parameter, and an unused angle parameter in the Effects Control panel, and modifies the source pixels based on the parameters and current field rendering. If the field rendering is upper fields first, it will blend the upper fields of the upper half of the image with the color parameter by the percentage specified by the slider parameter. If the field rendering is lower fields first, it will blend the lower fields of the lower half of the image. If the field rendering is off, it will blend every other row of pixels. The alpha is preserved. It demonstrates use of PPix Suite and Pixel Format Suite. When the setup button is pressed, it displays a message box on Windows, and an alert on macOS.
SDK_ProcAmp	This GPU-accelerated effect demonstrates a simple ProcAmp effect using the After Effects API with the Premiere Pro GPU extensions. The effect is found in the SDK folder of the Video Effects in the Effects Control panel. It supports OpenCL and Metal acceleration. ***This sample requires macOS 10.11.4 and later.***
Vignette	This effect creates a vignette on video using the After Effects API with the Premiere Pro GPU extensions. has OpenCL, CUDA, and software render paths. Software rendering in Premiere Pro includes 8-bit/32-bit RGB/YUV software render paths. Software rendering in After Effects includes 8-bit and 32-bit smart rendering. Thanks to Bart Walczak for donating this sample.
SDK_CrossDissolve	This GPU-accelerated transition demonstrates a simple cross dissolve transition using the After Effects API with the transition extensions. The transition is found in the SDK folder of the Video Transitions in the Effects Control panel. It supports OpenCL and CUDA acceleration.

Device	This device controller pretends to control a hardware device. To select it, choose Edit > Preferences > Device Control > Devices: SDK Device Control. It reports status in the status area of the Capture panel, and a simulated timecode location in response to the transport controls. Since the device controller and recorder sample plug-ins both only simulate hardware, they will return different timecode values to the app. You can set the Capture panel to only display device controller timecode by going to Preferences > Capture, and check “Use device control timecode” When the device control Options button is pressed or Export To Tape is selected, it displays a message box on Windows, and an alert on macOS. It demonstrates a sample error message when using the Step Back button at time zero.
ControlSurface	Currently Win-only. You should see the plug-in in the PPro UI in Preferences > Control Surface, when you hit the Add button, as one of the options in the Device Class drop-down next to Mackie and EUCON (currently shows as “SDK Control Surface Sample”). Just a starting point for you to add your functionality.

How To Build the SDK Sample Projects

The required development environment is described in the SDK Audience section.

See a quickstart video on building an effect using a similar SDK (on macOS):
adobe.ly/2sjMDwM

We’ve combined the sample projects into a single master project, stored in the Examples folder of the SDK. For macOS it is `BuildAll.xcodeproj`; for Windows, it is `_BuildAll.sln`.

You’ll need to specify some settings so that the plug-ins are built into a folder where they will be loaded by the application you are developing for.

We recommend plug-ins be built into the following folder for macOS:
`/Library/Application Support/Adobe/Common/Plug-ins/[version]/MediaCore/`
`version` is locked at 7.0 for all CC versions, or CSx for earlier versions.
For example: `/Library/Application Support/Adobe/Common/Plug-ins/7.0/MediaCore/`
or: `/Library/Application Support/Adobe/Common/Plug-ins/CS6/MediaCore/`

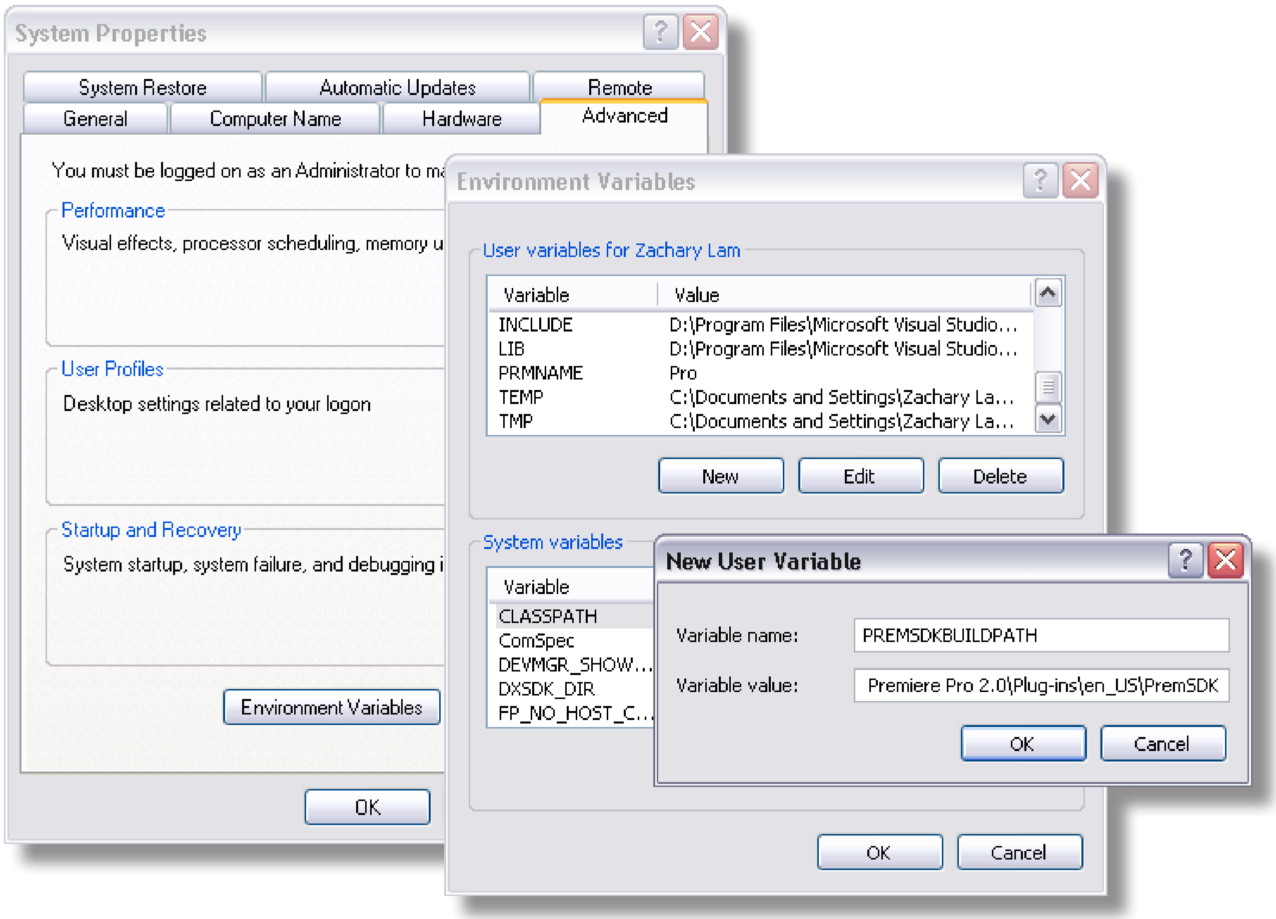
and the following path for Windows:
`[Program Files]\Adobe\Common\Plug-ins\[version]\MediaCore\`
for example: `C:\Program Files\Adobe\Common\Plug-ins\7.0\MediaCore\`

or: `C:\Program Files\Adobe\Common\Plug-ins\CS6\MediaCore\`

Note that this Windows path is only recommended for development purposes. Windows installers should follow the guidelines here.

In Xcode, set the build location for the project in File > Project Settings. Press the Advanced button. Under Build Location choose Custom, select Absolute, and set the Products path.

In Visual Studio, for convenience, we have set the Output File for all sample projects to use the base path set by the environment variable `PREMSDKBUILDPATH`. You'll need to set this as a user environment variable for your system, and shown in the screenshot below.



Variable	Value
INCLUDE	D:\Program Files\Microsoft Visual Studio...
LIB	D:\Program Files\Microsoft Visual Studio...
PRMNAME	Pro
TEMP	C:\Documents and Settings\Zachary La...
TMP	C:\Documents and Settings\Zachary La...

Variable
CLASSPATH
ComSpec
DEVMGR_SHOW...
DXSDK_DIR
FP_NO_HOST_C...

Variable name: PREMSDKBUILDPATH
Variable value: Premiere Pro 2.0\Plug-ins\en_US\PremSDK

1) On Windows 7, right-click *My Computer* > *Properties*, and in the left sidebar choose *Advanced System Settings*.
2) In the dialog that appears, hit the *Environment Variables* button.
3) In the *User variables*, create a new variable named `PREMSDKBUILDPATH`, with the path as described above. (e.g. "C:\Program Files\Adobe\Common\Plug-ins\[version]\MediaCore\").
4) Log out of Windows, and log back in so that the variable will be set.

When compiling the plug-ins, if you see a link error such as:

"Cannot open file "[MediaCore plug-ins path]\plugin.prm", make sure to launch Visual Studio in administrator mode. In your Visual Studio installation, right-click devenv.exe, Properties > Compatibility > Privilege Level, click "Run this program as an administrator".

It's not recommended to copy plug-ins into the plug-in folder after you've built them, because that won't allow you to debug the plug-ins while the host application is running.

Debugging Plug-ins

Once you've got the plug-in building directly into the plug-ins folder as explained above, here's how to specify Premiere Pro as the application to run during debug sessions:

On Windows:
1) In the Visual Studio solution, in the Solution Explorer panel, choose the project you want to debug
2) Right-click it and choose Set as StartUp Project
3) Right-click it again and choose Properties
4) In Configuration Properties > Debugging > Command, provide the path to the executable file of the host application the plug-ins will be running in (this may be Premiere Pro or After Effects)
5) From there you can either hit the Play button, or you can launch the application and later at any point choose Debug > Attach to Process...

On macOS:
1) In Xcode, in the Project Navigator, choose the xcodeproj you want to debug
2) Choose Product > Scheme > Edit Scheme...
3) Under Run, in the Info tab, for Executable, choose the host application the plug-ins will be running in (this may be Premiere Pro or After Effects)
4) From there you can either hit the Play button to build and run the current scheme, or you can launch the application and later at any point choose Debug > Attach to Process.

Another way to do this in Visual Studio is by placing a line of code:
`_asm int 3;`
or `DebugBreak();`
You will then receive the Microsoft error reporting message, but if you hit the Debug button you will enable Just-In-Time Debugging and can attach to the process.

Load 'Em Up!

Plug-in Caching

On its first launch, Premiere Pro loads all the plug-ins, reads the PiPL resource, and sends any startup selectors to determine the plug-ins' capabilities. To speed up future application launches, it saves some of these capabilities in what we call the plug-in cache (the registry on Windows, a Property List file on macOS).

The next time the application is launched, the cached data is used wherever possible, rather than loading all the plug-ins on startup. Using this changed data will make the application launch faster, but for a small set of plug-ins that need to be initialized every time, it may be undesirable. These include plug-ins that need to get run-time information that might change in between app launches (i.e. installed codec lists), and plug-ins that check for hardware and need to be able to fail. So we give your plug-in control final say over whether or not it is reloaded each time.

By default, importers, recorders, and exporters are not cached. Exporters can be cached by setting `exExporterInfoRec.isCacheable` to non-zero during *exSelStartup*. Importers and recorders can be cached by returning `*IsCacheable` instead of `*NoError` (e.g. for importers, `imIsCacheable` instead of `imNoError`) on the startup selector.

By default, legacy video filters and device controllers are cached by default. To specify that legacy video filters must be reloaded each time, rather than cached, Premiere filters should respond to *fsCacheOnLoad*.

Resolving Plug-in Loading Problems

There are various tools to help in the development process.

On Windows only, you can force Premiere to reload all the plug-ins by holding down shift on startup. The plug-in cache on macOS may be deleted manually from the user folder, at `~/Library/Preferences/com.Adobe.Premiere Pro [version].plist.`

For plug-in loading issues, you may first check one of the plug-in loading logs.
On Windows:
`[user folder]\AppData\Roaming\Adobe\Premiere Pro\[version number]\Plugin Loading.log`
On macOS, this is:
`~/Library/Application Support/Adobe/Premiere Pro/[version number]/Plugin Loading.log`

Your plug-in will be listed by path and filename, and the log will contain details on what happened during the plug-in loading process. Starting in CC 2017, it now logs any error codes returned from an effect on *PF_Cmd_GLOBAL_SETUP*.

If the log says a plug-in has been marked as Ignore, the most common culprit is a library dependency that could not be loaded. If your plug-in uses some image processing or proprietary code library, is it installed on the system, and in the right place? On Windows, a tool such as Dependency Walker (depends.exe) is helpful to check a plug-in's dependencies.

Library Linkage

On Windows, we strongly recommend dynamically linking to libraries, rather than static linking. In Visual Studio, the runtime library linkage setting is in C/C++ > Code Generation > Runtime Library. We ask developers to compile with the /MD flag (or /MDd for debug builds), and not with the /MT flag. Failure to do so can contribute to the problem where the Premiere Pro process can run out of fiber-local storage slots, and subsequent plug-ins fail to load.

No Shortcuts

The Premiere Pro plug-in loader does not follow Windows shortcuts. Although it does follow macOS symbolic links, we recommend against using symbolic links in the plug-ins folder, since the plug-in loader checks the timestamp of the symbolic link rather than the timestamp of the plug-in pointed to.

Explanation: If you use a symbolic link and the plug-in fails to load once (for example, if the plug-in pointed to isn't there) it will be marked to ignore when Premiere launches. Even if the plug-in is restored to the proper location, the plug-in loader will check the modification time of the symbolic link, rather than the plug-in pointed to, and continue to ignore the plug-in until the modification date of the symbolic link is updated. So plug-ins should be placed directly in a plug-ins folder or subfolder.

Plug-in Installation

Plug-ins must have an installer. This simplifies installation by the user, provides more compact distribution, and ensures all the pieces are installed correctly. Create a container folder for your plug-in(s) to minimize user confusion. Don't unintentionally overwrite existing plug-ins, or replace newer versions. The installer should find the default installation directories as described below. It is also appreciated when an installer allows the user to specify an alternate directory.

Plug-ins should be installed in the common plug-in location. Supported Premiere and After Effects plug-ins installed here will be loaded by Premiere Pro, After Effects, Audition, and Media

Encoder. Other plug-in types, such as QuickTime and VfW codecs should be installed at the operating system level.

Windows

Starting in CC, each version of Premiere Pro will create a unique registry key that provide locations of folders of interest for third-party installations for that version. For example, here are the registry values for CC 2015.3:

Key: HKEY_LOCAL_MACHINE/Software/Adobe/Premiere Pro/10.0/
Value name: CommonPluginInstallPath
Value data: C:\Program Files\Adobe\Common\Plug-ins\7.0\MediaCore\ (or whatever the proper MediaCore plug-ins folder is; note that this is the same as what the After Effects installer provides for a corresponding registry key)

Starting in CC 2015.3, control surface plug-ins should be installed here:
/Library/Application Support/Adobe/Common/Plug-ins/ControlSurface/

For sequence presets:
Value name: SequencePresetsPath
Value data: [Adobe Premiere Pro installation path]\Settings\SequencePresets\

For sequence preview presets:
Value name: SequencePreviewPresetsPath
Value data: [Adobe Premiere Pro installation path]\Settings\EncoderPresets\SequencePreview\

For exporter presets:
Value name: CommonExporterPresetsPath
Value data: [User folder]\AppData\Roaming\Adobe\Common\AME\7.0\Presets\

Effects presets:
Value name: PluginInstallPath
Value data: [Adobe Premiere Pro installation path]\Adobe Premiere Pro CC\Plug-ins\Common
Third-party installers can start from this path, and then modify the string to build the path to the language-specific effect presets.

Prior to CC, the only path given in the registry was the common plug-in path for the most recently installed version of Premiere Pro:
HKEY_LOCAL_MACHINE/Software/Adobe/Premiere Pro/CurrentVersion
Value name: Plug-InsDir
Value data: REG_SZ containing the full path of the plug-in folder
As an example:
C:\Program Files\Adobe\Common\Plug-ins\CS6\MediaCore\

The best way to locate other preset folders was to start from the root path for Premiere Pro in the registry at HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\App Paths\Adobe Premiere Pro.exe. Then, just add the proper subdirectories as described in the macOS section.

macOS

Starting in CC 2015, we now provide installer hints for Mac. You'll find a new plist file "com.Adobe.Premiere Pro.paths.plist" at "/Library/Preferences". This contains hints for your Mac installer to know where to install plug-ins, and is similar to the registry entries we have been providing on Win.

The common plug-in location is at:
/Library/Application Support/Adobe/Common/Plug-ins/[version]/MediaCore/

Starting in CC 2015.3, control surface plug-ins should be installed here:
/Library/Application Support/Adobe/Common/Plug-ins/ControlSurface/

Following OS X Code Signing guidelines, plug-ins should be installed in this separate shared location rather than in the application bundle.

For sequence presets:
/Settings/SequencePresets/[Your specific folder]/
Sequence preview presets:
/Settings/EncoderPresets/SequencePreview/[Your editing mode GUID]/
Encoder presets:
/MediaIO/systempresets/[Your exporter folder]/
Effects presets:
/Plug-ins/[language subdirectory]/Effect Presets/ (see Localization for the list of language codes)
Editing modes:
/Settings/Editing Modes/

Plug-in Naming Conventions

On Windows, Premiere Pro plug-ins must have the file extension ".prm". On macOS, they have the file extension ".bundle". Other supported plug-in standards use their conventional file extensions: ".aex" for After Effects plug-ins, ".dll" for VST plug-ins.

While it is not required for your plug-in to load, naming your plug-ins using the plug-in type as a prefix (e.g. ImporterSDK, FilterSDK, etc.) will help reduce user confusion.

Plug-in Blacklisting

Have a plug-in that works fine in one CS application, but has problems in another CS application? Now, specific plug-ins can be blocked from being loaded by MediaCore in specific applications, using blacklists. Note that this does not work for After Effects plug-ins loaded by AE, although it does work for AE plug-ins loaded in Premiere Pro.

In the plug-ins folder, look for the appropriate blacklist file, and append the the filename of the plug-in to the file (e.g. BadPlugin, not BadPlugin.prm). If the file doesn't exist, create it first. "Blacklist.txt" contains names of plug-ins blacklisted from all apps. Plug-ins can be blocked from loading in specific apps by including them in "Blacklist Adobe Premiere Pro.txt", or "Blacklist After Effects.txt", etc.

Creating Sequence Presets

Not to be confused with encoder presets or sequence preview encoder presets, sequence presets are the successor to project presets. They contain the video, audio, timecode, and track layout information used when creating a new sequence.

If you wish to add Sequence Presets for the New Sequence dialog, save the settings with a descriptive name and comment. Emulate our settings files. Install the presets as described in the section, "Plug-in Installation".

Application-level Preferences

For Windows 7 restricted user accounts, the only place that code has guaranteed write access to a folder is inside the user documents folder and its subfolders.
..\Users\[user name]\AppData\Roaming\Adobe\Premiere Pro\[version]\
This means that you cannot save data or documents in the application folder. There is currently no plug-in level API for storing preferences in the application prefs folder. Plug-ins can create their own preferences file in the user's Premiere prefs directory like so:

```
HRESULT herr = SHGetKnownFolderPath(FOLDERID_RoamingAppData,
     0, NULL, preferencesPath);
strcat(preferencesPath,
     "\\Adobe\\Premiere Pro\\[version]\\MyPlugin.preferences");
```

On MacOS:
```
NSSearchPathForDirectoriesInDomains(NSApplicationSupportDirector
y,NSLocalDomainMask,…)
```

This should get you started getting the Application Support folder which you can add onto to create something like:

```
/Library/Application Support/Adobe/Premiere Pro/[version]/
MyPlugin.preferences
```

Dog Ears

Premiere Pro's built-in player has a mode to display statistics, historically known as "dog ears", which can be useful in debugging and tuning performance of importers, effects, transitions, and transmitters. The statistics include frames per second, frames dropped during playback, pixel format rendered, render size, and field type being rendered.

You can bring up the debug console in Premiere Pro. You can do this via Ctrl/Cmd-F12. To enable the dog ears, type this:

```
debug.set EnableDogEars=true
```

to disable, use this:

```
debug.set EnableDogEars=false
```

If the enter keystroke seems to go to the wrong panel, this is an intermittent panel focus problem. Click the Tools or Info panel before typing in the Console panel, and the enter key will be processed properly.

Once enabled, the player displays the statistics as black text on a partially transparent background. This allows you to still see the underlying video (to some extent) and yet also read the text. When you turn off dog ears, the setting may not take effect until you switch or reopen your current sequence.

Note if you are developing a transmitter, displaying dog ears will result in duplicate calls to PushVideo for the same frame. This happens because the player routinely updates the dog ears on a timer even when the frame hasn't changed for updated stats. As of CS6, this triggers a PushVideo to active transmitters as a side effect.

Localization

The language used by Premiere Pro is decided by the user during installation. Plug-ins can determine this setting from the following locations:
On Windows, in the registry at HKEY_CURRENT_USER\Software\Adobe\Premiere Pro\[version], in a key named "Language".
On macOS, at ~/Library/Preferences/com.Adobe.Premiere Pro.[version].plist, at Root > Language.
The string will be set to one of the values below by Premiere Pro at startup.

Language	String
English	en_US
French	fr_FR
German	de_DE
Italian	it_IT
Japanese	ja_JP
Spanish	es_ES
Korean	ko_KR
Chinese (new in CC)	zh_CN
Russian (new in CC 2014)	ru_RU
Brazilian Portugese (new in CC 2014)	pt_BR

Changing the string will not change the language Premiere Pro runs in, unless you override the application language by placing a file in the following location:

Windows: [App installation folder]\lang-override.txt
macOS: [App Installation folder]/[Premiere Pro application package]/Contents/lang-override.txt

Best Practices

When a plug-in receives a selector it doesn't recognize, it should always return the code specific to the plug-in type that means the selector is not supported (i.e. imUnsupported, rmUnsupported, etc). In this way, new selectors can be added to the API and legacy plug-ins will automatically answer whether or not they support it.

Structure Alignment

All the sample projects include PrSDKTypes.h. This header sets the proper (single-byte) structure alignment and specifies the necessary (C-style) external linkage.

2 Resources

There are two types of special resources that are specific to Premiere plug-ins: the PiPL and the IMPT. This chapter describes these resources, and how certain plug-in types use them.

Plug-In Property Lists (PiPL) Resource

For many plug-in types, Premiere loads a PiPL (Plug-in Property List) resource. The PiPL is described in a file with a ".r" extension. The complete PiPL syntax is described in PiPL.r. You'll notice that PiPLs are really old. A vestige of 68k macOS programming, they spread to Windows. However, if you develop from the sample projects, you shouldn't have to do anything to get them to build properly for Latin languages.

Which Types of Plug-ins Need PiPLs?

Exporters, players, and recorders do not need PiPLs.

Standard importers do not need PiPLs. Synthetic and custom importers use a basic PiPL to specify their name, and the match name that Premiere uses to identify them. The name appears in the File > New menu.

Device controllers use a basic PiPL to specify their name and the match name that Premiere uses to identify them.

Video filters use an extended PiPL to specify their name, the match name that Premiere uses to identify them, the bin they go in, how they handle pixel aspect ratio, whether or not they have randomness, and their parameters. For more information on the ANIM_FilterInfo and ANIM_ParamAtom sections, see the resources section in the Video Filters chapter.

A Basic PiPL Example

```
#define plugInName         "SDK Custom Import"
```

```
#define plugInMatchName   "SDK Custom Import"

resource 'PiPL' (16000) {
{
     // The plug-in type
     Kind {PrImporter},

     // The name as it will appear in a Premiere menu, this can be localized
     Name {plugInName},

     // The internal name of this plug-in - do not localize this. This is used for both Premiere
          and After Effects plug-ins.
     AE_Effect_Match_Name {plugInMatchName}

// Transitions and video filters define more PiPL attributes here

}
};
```

How PiPLs Are Processed By Resource Compilers

On macOS, .r files are processed natively by Xcode, as a Build Phase of type Build Carbon Resources. This step is already set for the sample projects.

On Windows, .r files are processed with CnvtPiPL.exe, which creates an .rcp file based upon custom build steps in the project. The .rcp file is then included in the .rc file along with any other resources the plug-in uses. These custom build steps are already in place in the sample projects. To view them, open up the sample project in .NET. In the Solution Explorer, right-click the .r file and choose Properties. In the dialog, choose the Custom Build Step folder. The Command Line contains the script for executing the CnvtPiPL.exe. Unless you are using a different compiler than the support compiler, or adding support for Asian languages, you should not need to modify the custom build steps. This script may also be found as a text file in the SDK at \Examples\Resources\Win\Custom Build Steps.txt. This text file also describes the additional switches used for Asian languages.

IMPT Resource

Premiere Pro looks for an IMPT resource to identify a plug-in as an importer. Before Premiere Pro 1.0, the IMPT resource was also used to declare the file extension supported by an importer. Since file extensions are now declared during imGetIndFormat, the drawtype four character code in the IMPT resource is no longer used by Premiere Pro. However, a unique drawtype fourcc is needed for the importer to function properly in After Effects on macOS. Do not use 0x4D4F6F76. This is already reserved by After Effects.

```
1000 IMPT DISCARDABLE
BEGIN
     0x12345678 // Put your own unique hexadecimal code here
END
```

3 Universals

This chapter covers topics that are common to more than one type of Premiere plug-in. We start by discussing fundamental concepts and common data structures. The rest of the chapter discusses the various function suites that are available to plug-ins.

Time

There are two different representations of time: scale over sampleSize, and ticks.

scale over sampleSize

The first representation of time uses `value/scale/sampleSize` components, either separated, or combined in a `TDB_TimeRecord` structure. `scale` over `sampleSize` defines the timebase. For example, to represent the NTSC standard of 29.97 frames per second, `scale` / `sampleSize` = 30000 / 1001. To represent the PAL standard of 25 frames per second, 25 / 1. To represent the 24p standard of 23.976, 23976 / 1000, or 24000 / 1001. To represent most other timebases, use `sampleSize` = 1, and `scale` is the frame rate (e.g. 15, 24, 30 fps, etc). Another way of thinking about `scale` and `sampleSize` is that `sampleSize` is the duration of a frame of video, and `scale` is that duration of a second of video.

`value` is the time in the timebase given by `scale` over `sampleSize`. So, for example, 30 frames with a sampleSize of 1001 have a value of 30030. To convert `value` to seconds, divide by `scale`. To convert `value` to frames, divide by `sampleSize`.

Sometimes, as when handling audio-only media, `sampleSize` refers to a sample of audio, and `sampleSize` = 1. In this case, `scale` is the audio sampling rate (22050, 32000, 44100, 48000 Hz, etc).

PrTime

Most newer areas of the API use a tick-based time value that is stored in a signed 64-bit integer. Variables that use this new format are of type `PrTime`. When a frame rate is represented as a PrTime, the frame rate is the number of ticks in a frame duration.

The current number of ticks per second must be retrieved using the callback in the Time Suite. This rate is guaranteed to be constant for the duration of the application's run-time.

Video Frames

Premiere stores each video frame in a `PPix` structure. A `PPixHand` is a handle to a `PPix`. This structure should not be accessed directly, but manipulated using various suites such as the PPix Suite, PPix 2 Suite, PPix Creator Suite, and PPix Creator 2 Suite.

Far from being just a boring buffer of RGB data, `PPix`es can contain a significant amount of information about a video frame, including: rectangle bounds (width, height), pixel aspect ratio, pixel format, field dominance, alpha interpretation, color space, gamma encoding, and more.

In the pixel buffer itself, there may be padding between neighboring horizontal rows of pixels. So when iterating through the pixels in the buffer, don't assume that the first pixel on the next line is stored immediately after the last pixel on the current line. Honor the rowbytes, which is a measure of the size in bytes of a row of pixels, including any extra padding.

Frames are guaranteed to be 16-byte aligned.

Pixel Formats and Color Spaces

As of CC, Premiere supports 69 different pixel formats, not including raw and custom formats. Why so many? Each pixel format has it's unique advantages and disadvantages. 8-bit formats are compact, but lack quality. 32-bit ones are more accurate, but overkill in some situations. Compressed formats are great for storing raw frames, but bad for effects processing. And so on... In summary, choose wisely!

What Format Should I Use?

Starting in CS4, plug-ins no longer need to support 8-bit BGRA at a minimum. If required, Premiere can make intermediate format conversions in the render pipeline, although these intermediate conversions will be avoided if possible. Previously in CS3 and earlier, all plug-ins except importers needed to support 8-bit per channel BGRA, even if they supported other formats.

When choosing which pixel formats to support, there are different factors to consider, depending on the plug-in type.

Importers

Importers typically should provide frames in a format closest to the source format. If needed, Premiere can convert any compressed format to a 8-bit or 32-bit uncompressed format. Keeping the format compressed as long as possible as it passes through the render pipeline will save memory and bandwidth.

Starting in Premiere Pro CC 2014, importers can now choose the format they are rendering in. This allows importers to change pixel formats and quality based on criteria like enabled hardware and other source settings, such as HDR. To handle the negotiation, implement *imSelectClipFrameDescriptor*.

Effects

Effects should support the uncompressed format(s) that works best with the effect's pixel processing algorithm. If the algorithm is based on RGB pixel calculations, provide a fast render path using 8-bit BGRA, and optionally a high-quality render path using 32-bit BGRA. If the algorithm is Y'UV-based, use the VUYA pixel formats.

Exporters and Transmitters

Exporters and transmitters should request frames in a format closest to the output format. New in CS5, `PrPixelFormat_Any` can be used in exporter render requests. Any render function that takes a list of pixel formats can now be called with just two formats - the desired 4:4:4:4 pixel format, and `PrPixelFormat_Any`. This allows the host to avoid frame conversions and decompressions in many very common cases. The best part is that the plug-in doesn't need to understand all the possible pixel formats to make use of this. It can use the Image Processing Suite to copy/convert from any a PPix of any format to a separate memory buffer, which is a copy that would likely need to be done anyway.

After the request is made, Premiere analyzes the preferred format of all importers and effects that are used to produce a single rendered frame, as well as the list of requested formats, and chooses the best format to use on a per-segment basis. If the requestor supports more than one format, and the importers and effects used for various clips in the sequence support different formats, the render may use different formats for each segment.

Premiere Pro's built-in Rec. 601 to 709 color space conversion can be slow. So if the majority of the sources and effects use the Rec 601 color space, and if the exporter or transmitter can handle the 601 to 709 conversion quickly on its own, it may be faster to do the color space conversion in the exporter or transmitter.

Other Considerations

For high-bit depth support, the 32f formats are the recommended route, rather than the 16u formats. For example, an exporter that supports 10-bit Y'UV should ask for frames in 32f Y'UV format, and then convert the 32f to 10u.

The ARGB formats can be natively used in the After Effects render pipeline, and are used by After Effects effect plug-ins that do not specifically support any other pixel format. However, in Premiere Pro, these ARGB formats will require byte-swapping, and shouldn't be used.

Byte Order

BGRA, ARGB, and VUYA are written in order of increasing memory address from left to right. Uncompressed formats have a lower-left origin, meaning the first pixel in the buffer describes the pixel in the lower-left corner of the image. Compressed formats have format-specific origins. Use calls in the Image Processing Suite to get details on any format.

8-bit and 16-bit BGRA formats do not contain super whites or super blacks.

The 16-bit formats use channels that go from black at 0 to white at 32768, like After Effects and Photoshop 16-bit formats.

PrPixelFormat	Bits / Channel	Format / FourCC	Additional Details
Unpacked, Uncompressed			
`BGRA_4444_8u`	8	RGB	
`VUYA_4444_8u`	8	Y'UV	
`VUYA_4444_8u_709`	8	Y'UV	Rec. 709 color space. New in Premiere Pro 4.1.
`BGRA_4444_16u`	16	RGB	
`BGRA_4444_32f`	32	RGB	
`VUYA_4444_32f`	32	Y'UV	
`VUYA_4444_32f_709`	32	Y'UV	Rec. 709 color space. New in Premiere Pro 4.1.
Unpacked, Uncompressed, native After Effects support only			
`ARGB_4444_8u`	8	RGB	For native After Effects support. For native Premiere Pro support, use BGRA.
`ARGB_4444_16u`	16	RGB	
`ARGB_4444_32f`	32	RGB	

PrPixelFormat	Bits / Channel	Format / FourCC	Additional Details
Unpacked, Uncompressed, with implicit alpha			
BGRX_4444_8u	8	RGB	Implicitly opaque alpha channel. The actual data may be left filled with garbage, which allows optimized processing by both the plug-in and host, with the understanding the the alpha channel is opaque. New in Premiere Pro CS5.
VUYX_4444_8u	8	Y'UV	
VUYX_4444_8u_709	8	Y'UV	
XRGB_4444_8u	8	RGB	
BGRX_4444_16u	16	RGB	
XRGB_4444_16u	16	RGB	
BGRX_4444_32f	32	RGB	
VUYX_4444_32f	32	Y'UV	
VUYX_4444_32f_709	32	Y'UV	
XRGB_4444_32f	32	RGB	
BGRP_4444_8u	8	RGB	Premultiplied alpha. New in Premiere Pro CS5.
VUYP_4444_8u	8	Y'UV	
VUYP_4444_8u_709	8	Y'UV	
PRGB_4444_8u	8	RGB	
BGRP_4444_16u	16	RGB	
PRGB_4444_16u	16	RGB	
BGRP_4444_32f	32	RGB	
VUYP_4444_32f	32	Y'UV	
VUYP_4444_32f_709	32	Y'UV	
PRGB_4444_32f	32	RGB	
Linear RGB			
BGRA_4444_32f_Linear	32	RGB	These RGB formats have a gamma of 1, rather than the standard 2.2. New in Premiere Pro CS5.
BGRP_4444_32f_Linear	32	RGB	
BGRX_4444_32f_Linear	32	RGB	
ARGB_4444_32f_Linear	32	RGB	
PRGB_4444_32f_Linear	32	RGB	
XRGB_4444_32f_Linear	32	RGB	
Packed, Uncompressed formats			
RGB_444_10u			New in Premiere Pro CC. Full range 10-bit 444 RGB little-endian
YUYV_422_8u_601	8	'YUY2'	New in Premiere Pro CS4.
YUYV_422_8u_709	8	'YUY2'	Rec. 709 color space. New in Premiere Pro CS4.
UYVY_422_8u_601	8	'UYVY'	New in Premiere Pro CS4.

PrPixelFormat	Bits / Channel	Format / FourCC	Additional Details
`UYVY_422_8u_709`	8	'UYVY'	Rec. 709 color space. New in Premiere Pro CS4.
`V210_422_10u_601`	10	'v210'	New in Premiere Pro CS4.
`V210_422_10u_709`	10	'v210'	Rec. 709 color space. New in Premiere Pro CS4.
`UYVY_422_32f_601`	32	'UYVY'	New in Premiere Pro CC.
`UYVY_422_32f_709`	32	'UYVY'	New in Premiere Pro CC.
Compressed Y'UV			
`NTSCDV25`	8	DV25 / 'dvsd'	
`PALDV25`	8	DV25 / 'dvsd'	
`NTSCDV50`	8	DV50 / 'dv50'	
`PALDV50`	8	DV50 / 'dv50'	
`NTSCDV100_720p`	8	DV100 720p / 'dvh1'	
`PALDV100_720p`	8	DV100 720p / 'dvh1'	
`NTSCDV100_1080i`	8	DV100 1080i / 'dvh1'	
`PALDV100_1080i`	8	DV100 1080i / 'dvh1'	
`YUV_420_MPEG2_FRAME_PICTURE_PLANAR_8u_601`	8	Y'UV 4:2:0 / 'YV12'	Progressive Rec. 601 color space
`YUV_420_MPEG2_FIELD_PICTURE_PLANAR_8u_601`	8	Y'UV 4:2:0 / 'YV12'	Interlaced Rec. 601 color space
`YUV_420_MPEG2_FRAME_PICTURE_PLANAR_8u_601_FullRange`	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS5.5. Progressive Rec. 601 color space, full range Y'UV
`YUV_420_MPEG2_FIELD_PICTURE_PLANAR_8u_601_FullRange`	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS5.5. Interlaced Rec. 601 color space, full range Y'UV
`YUV_420_MPEG2_FRAME_PICTURE_PLANAR_8u_709`	8	Y'UV 4:2:0 / 'YV12'	Progressive Rec. 709 color space
`YUV_420_MPEG2_FIELD_PICTURE_PLANAR_8u_709`	8	Y'UV 4:2:0 / 'YV12'	Interlaced Rec. 709 color space

PrPixelFormat	Bits / Channel	Format / FourCC	Additional Details
YUV_420_MPEG2_FRAME_PICTURE_PLANAR_8u_709_FullRange	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Progressive Rec. 709 color space, full range Y'UV. Matricies scaled from 709 by each component's excursion (Y is scaled by 219/255 and UV scaled by 224/256)
YUV_420_MPEG2_FIELD_PICTURE_PLANAR_8u_709_FullRange	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Interlaced Rec. 709 color space, full range Y'UV
YUV_420_MPEG4_FRAME_PICTURE_PLANAR_8u_601	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Progressive Rec. 601 color space
YUV_420_MPEG4_FIELD_PICTURE_PLANAR_8u_601	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Interlaced Rec. 601 color space
YUV_420_MPEG4_FRAME_PICTURE_PLANAR_8u_601_FullRange	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Progressive Rec. 601 color space, full range Y'UV
YUV_420_MPEG4_FIELD_PICTURE_PLANAR_8u_601_FullRange	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Interlaced Rec. 601 color space, full range Y'UV
YUV_420_MPEG4_FRAME_PICTURE_PLANAR_8u_709	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Progressive Rec. 709 color space
YUV_420_MPEG4_FIELD_PICTURE_PLANAR_8u_709	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Interlaced Rec. 709 color space
YUV_420_MPEG4_FRAME_PICTURE_PLANAR_8u_709_FullRange	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Progressive Rec. 709 color space, full range Y'UV. Matricies scaled from 709 by each component's excursion (Y is scaled by 219/255 and UV scaled by 224/256)
PrPixelFormat_YUV_420_MPEG4_FIELD_PICTURE_PLANAR_8u_709_FullRange	8	Y'UV 4:2:0 / 'YV12'	New in Premiere Pro CS6. Interlaced Rec. 709 color space, full range Y'UV
Miscellaneous			

PrPixelFormat	Bits / Channel	Format / FourCC	Additional Details
`Raw`	?	?	Raw, opaque data, with no rowbytes or height

Custom Pixel Formats

New in CS4, custom pixel formats are supported. Plug-ins can define a pixel format which can pass through various aspects of our pipeline, but remain completely opaque to the built-in renderers. Use the macro `MAKE_THIRD_PARTY_CUSTOM_PIXEL_FORMAT_FOURCC` in the Pixel Format Suite. Please use a unique name to avoid collisions. The format doesn't need to be registered in any sense. They can just be used in the same way the current pixel formats are used, though in many cases they will be ignored.

The first place the new pixel formats can appear in the render pipeline is at the importer level. Importers can advertise the availability of these pixel formats during *imGetIndPixelFormat*, just as they would for any other format. Note that importers must also support a non-custom pixel format, for the case where the built-in renderer is used, which would not be prepared to handle an opaque pixel format added by a third-party. In the importer, use the new `CreateCustomPPix` call in the PPix Creator 2 Suite, and specify a custom pixel format and a memory buffer size, and the call will pass back a `PPix` of the requested format. These PPixes can then be returned from an importer, like any other. The memory for the `PPix` will be allocated by MediaCore, and must be a flat data structure as they will need to be copied between processes. However, because the data itself is completely opaque, it can easily be a reference to another pixel buffer, as long as the reference can be copied. For example, the buffer could be a constant 16 bytes, containing a GUID which can be used to access a memory buffer by name in another process.

To query for available custom pixel formats from the player, use the `GetNumCustomPixelFormats` and `GetCustomPixelFormat` calls in the Clip Render Suite. The custom pixel formats will not returned by the regular calls to get the supported frame formats, mostly to prevent them from being used. The other Clip Render Suite functions will accept requests for custom pixel formats and will return these custom PPixes like any others. With the Clip Render Suite, a third-party player can directly access these custom `PPix`es from a matched importer.

Smart Rendering

Smart rendering involves passing compressed frames from the importer to the exporter, to bypass any unnecessary decompression and recompression, which reduces quality and performance. The way to implement this is by passing custom PPixes between an importer, exporter, and usually a renderer.

In the rare case of exporting a single clip, using the Clip Render Suite in the exporter to request custom PPixes from the importer is sufficient. But in the more common case of exporting a sequence, a renderer that supports the custom pixel format is required.

When an exporter running in Media Encoder parses the segments in the sequence, it only has a very high-level view. It sees the entire sequence as a single clip (which is actually a temporary project file that has been opened using a Dynamic Link to the PProHeadless process), and it sees any optional cropping or filters as applied effects. So when the exporter parses that simple, high-level sequence, if there are no effects, it should use the MediaNode's `ClipID` with the Clip Render Suite to get frames directly from the PProHeadless process. In the PProHeadless process, the renderer can step in and parse the real sequence in all its glory. It can use the Clip Render Suite to get the frames in the custom pixel format directly from the importer, and then set the custom `PPix` as the render result. This custom `PPix` then is available to the exporter, in a pristine, compressed `PPix`.

Pixel Aspect Ratio

Pixel Aspect Ratio (PAR) is usually represented as a rational number, with a numerator and a denominator. Note that several PAR values were changed in CS4 to match broadcast standards. Here are some examples of pixel aspect ratios:

NTSC DV 0.9091 PAR is (10, 11)
NTSC DV Widescreen 1.2121 PAR is (40, 33)
PAL DV 1.0940 PAR is (768, 702)
PAL DV 1.4587 PAR is (1024, 702)
Square 1.0 PAR is (1,1)

In certain legacy structures, PAR is represented as a single 32-bit integer, such as in `recCapInfoRec.pixelAspectRatio`. This uses a representation where the numerator is bit-shifted 16 to the left, and OR'd with the denominator. For example NTSC DV 0.9091 PAR is `(10 << 16) | 11`.

Fields

There are different constants defined for fields. These constants are now largely interchangable in CS4, since the conflicting constants for the old compiler API have been removed.

Exporters, Players, Video Segment Suite, etc	Recorders
`prFieldsNone`	`kMALFieldsNone`
`prFieldsUpperFirst`	`kMALFieldsUpperFirst`
`prFieldsLowerFirst`	`kMALFieldsLowerFirst`

Exporters, Players, Video Segment Suite, etc	Recorders
`prFieldsUnknown`	`kMALFieldsUnknown`
`prFieldsAny`	`kMALFieldsInvalid`
`prFieldsInvalid`	

Audio

32-bit Float, Uninterleaved Format

All audio calls to and from Premiere use arrays of buffers of 32-bit floats to pass audio. Audio is not interleaved, rather separate channels are stored in separate buffers. So the structure for stereo audio looks like this:

```
float* audio[2];
```

where `audio[0]` is the address of a buffer N samples long, and `audio[1]` is the address of a second buffer N samples long. `audio[0]` contains the left channel, and `audio[1]` contains the right channel. N is the number of sample frames in the buffer.

Since Premiere uses 32-bit floats for each audio sample, it can represent values above 0 dB. 0 dB corresponds to +/- 1.0 in floating point. A floating point sample can be converted to a 16-bit short integer by multiplying by 32767.0 and casting the result to a short. E.g.:
`sample16bit[n] = (short int) (sample32bit[n] * 32767.0)`

The plug-in is responsible for converting to and from the 32-bit uninterleaved format when reading a file that uses a different format. There are calls to convert between formats in the Audio Suite. For symmetry in the int <--> float conversions, we recommend you use the utility functions provided.

Audio Sample Types

Since 32-bit floats are the only audio format ever passed, there is no option of sample type or bit depth. However, file formats do use a variety of sample types and bit depths, so `AudioSampleTypes` define a variety of possible formats. These formats are used to set members in structures passed to Premiere to define the user interface, and do not affect the format of the audio passed to and from Premiere.

PrAudioSampleType	Description
`kPrAudioSampleType_8BitInt`	8-bit integer
`kPrAudioSampleType_8BitTwosInt`	8-bit integer, two's complement
`kPrAudioSampleType_16BitInt`	16-bit integer
`kPrAudioSampleType_24BitInt`	24-bit integer
`kPrAudioSampleType_32BitInt`	32-bit integer
`kPrAudioSampleType_32BitFloat`	32-bit floating point
`kPrAudioSampleType_64BitFloat`	64-bit floating point
`kPrAudioSampleType_16BitIntBigEndian`	16-bit integer, big endian
`kPrAudioSampleType_24BitIntBigEndian`	24-bit integer, big endian
`kPrAudioSampleType_32BitIntBigEndian`	32-bit integer, big endian
`kPrAudioSampleType_32BitFloatBigEndian`	32-bit floating point, big endian
`kPrAudioSampleType_Compressed`	Any non-PCM format
`kPrAudioSampleType_Packed`	Any PCM format with mixed sample types
`kPrAudioSampleType_Other`	A sample type not in this list
`kPrAudioSampleType_Any`	Any available sample type (used by exporters)

Audio Sample Frames

A sample frame is a unit of measurement for audio. One audio sample frame describes all channels of one sample of audio. Each sample is a 32-bit float. Thus, the storage requirement of an audio sample frame in bytes is equal to 4 * number of channels.

Audio Sample Rate

`PrAudioSample` is a `prInt64`

Audio Channel Types

Premiere currently supports four different audio channel types: mono, stereo, 5.1, and max channel.

Greater than 5.1 channel support was originally added in Premiere Pro 4.0.1, with partial support for a 16 channel master audio track, only for importing OMFs and playing out to hardware. In CS6, 16-channel audio export was added. Starting in CC, the audio channel support is increased to 32 channels.

PrAudioChannelType	Description
`kPrAudioChannelType_Mono`	Mono
`kPrAudioChannelType_Stereo`	Stereo. The order of the stereo channels is: `kPrAudioChannelLabel_FrontLeft`, `kPrAudioChannelLabel_FrontRight`.
`kPrAudioChannelType_51`	5.1 audio. The order of the 5.1 channels is: `kPrAudioChannelLabel_FrontLeft`, `kPrAudioChannelLabel_FrontRight`, `kPrAudioChannelLabel_BackLeft`, `kPrAudioChannelLabel_BackRight`, `kPrAudioChannelLabel_FrontCenter`, `kPrAudioChannelLabel_LowFrequency`
`kPrAudioChannelType_MaxChannel`	New in CC. `kMaxAudioChannelCount`, defined as 32 channels as of CC. All channels use `kPrAudioChannelLabel_Discrete`.

Memory Management

Premiere Pro has a media cache in which it stores imported frames, intermediate frames (intermediate stages of a render), fully rendered frames, and audio. This is sized based on a specific percentage of physical memory, taking into account if multiple Production Premium applications like After Effects, Encore, etc are also running. PPro manages this cache itself, so as it adds new items to the cache, it flushes least recently used items.

What Really is a Memory Problem?

Often, users monitoring memory usage are alarmed when they see memory growing to a specific point during a render or playback. When the memory doesn't drop right back down after a render or playback, they might think they have found a memory leak. However, keeping in mind the function of the Premiere Pro media cache, this behavior is to be expected.

On the other hand, memory contention between plug-ins and the rest of Premiere Pro can lead to memory problems. If a plug-in allocates a significant amount of memory and the Premiere Pro media cache has not accounted for it, this means there is less free memory available after the media cache grows to the predefined size. Even if Premiere Pro does not completely run out of memory, limited memory can cause memory thrashing as memory is moved around to make room for video frames, which in turn can cause poor performance.

Solutions for Memory Contention

The best approach to reduce memory contention is to reduce the memory requirements of each plug-in. However, if the memory requirements of a plug-in are significant, it should also use the Memory Manager Suite to report any memory usage that would not already be accounted for. Frames allocated using the PPix Creator Suite are accounted for, but any memory allocated using the old PPix and Memory functions are not automatically accounted for.

Basic Types and Structures

These types and structures are defined in PrSDKTypes.h and PrSDKStructs.h, and are used throughout the Premiere API. Premiere defines cross-platform types for convenience when developing plug-ins for both Windows and Mac OS.

Name	Description
`prColor`	An unsigned 32-bit integer that stores an RGB color. This type is useful for the 8-bpc colors retrieved by the color picker in a video effect or transition. Color channels are stored as BGRA, in order of increasing memory address from left to right.
`prWnd`	A Windows `HWND` or Mac OS `NSView*`
`prParentWnd`	A Windows `HWND` or Mac OS `NSWindow*`
`prOffscreen`	A Windows `HDC`
`prRect`	A Windows `RECT` or Mac OS `Rect`. Use the utility function `prSetRect` to set the dimensions of a `prRect` struct. This should be used because Mac OS `Rect` members have a different ordering than Windows `RECT` members.

`prFloatRect`	`typedef struct {`
	`     float left;`
	`     float top;`
	`     float right;`
	`     float bottom;`
	`} prFloatRect;`

`prRgn`	A Windows `HRGN`

`prPoint, LongPoint`	`typedef struct {`
	`     csSDK_int32 x;`
	`     csSDK_int32 y;`
	`} prPoint, LongPoint;`
	`LongPoint` is deprecated, but still used for a couple of Bottleneck callbacks

Name	Description

`prFPoint`	`typedef struct`
	`{`
	`     double x;`
	`     double y;`
	`} prFPoint64;`

`prPixel`	(Deprecated)
`prPixelAspectRatio`	(Deprecated)
`PPix, *PPixPtr, **PPixHand`	Holds a video frame or field, and contains related attributes such as pixel aspect ratio and pixel format. Manipulate `PPix`s using the PPix Suite, never directly.

`TDB_TimeRecord`	A time database record representing a time value in the context of a video frame rate.
	`typedef struct {`
	`     TDB_Time value;`
	`     TDB_TimeScale scale;`
	`     TDB_SampSize sampleSize;`
	`} TDB_TimeRecord;`

`prBool`	Can be either `kPrTrue` or `kPrFalse`
`PrMemoryPtr, *PrMemoryHandle`	A `char*`
`PrTimelineID, PrClipID`	A 32-bit signed integer.
`prUTF8Char`	An 8-bit unsigned integer.
`PrSDKString`	An opaque data type that should be accessed using the new String Suite.

Name	Description

`PrParam`	Used for exporter parameters
	`struct PrParam`
	`{`
	`    PrParamType         mType;`
	`    union`
	`    {`
	`        csSDK_int8      mInt8;`
	`        csSDK_int16     mInt16;`
	`        csSDK_int32     mInt32;`
	`        csSDK_int64     mInt64;`
	`        float           mFloat32;`
	`        double          mFloat64;`
	`        csSDK_uint8     mBool;`
	`        prFPoint64      mPoint;`
	`        prPluginID      mGuid;`
	`        PrMemoryPtr     mMemoryPtr;`
	`    };`
	`};`
	
	`enum PrParamType`
	`{`
	`    kPrParamType_Int8 = 1,`
	`    kPrParamType_Int16,`
	`    kPrParamType_Int32,`
	`    kPrParamType_Int64,`
	`    kPrParamType_Float32,`
	`    kPrParamType_Float64,`
	`    kPrParamType_Bool,`
	`    kPrParamType_Point,`
	`    kPrParamType_Guid,`
	`    kPrParamType_PrMemoryPtr`
	`};`

`prDateStamp`	Used in by importers in `imFileAttributesRec.creationDateStamp`.
	`typedef struct`
	`{`
	`    csSDK_int32    day;`
	`    csSDK_int32    month;`
	`    csSDK_int32    year;`
	`    csSDK_int32    hours;`
	`    csSDK_int32    minutes;`
	`    double         seconds;`
	`} prDateStamp;`

Suites

There are different sets of function suites available to Premiere plug-ins. The SweetPea Suites are the more modern suites that have been added for most new functionality. The piSuites are still needed for various functionality that has not all been superceded by the SweetPea Suites. Whenever possible, use the SweetPea Suites.

There are also function suites more specific to certain plug-in types. The Bottleneck Functions are useful for transitions and video filters. Other suites available to only one plug-in type are documented in the appropriate chapter for that plug-in type.

SweetPea Suites

Overview

Suites common to more than one plug-in type are documented in this chapter below. Suites that are only used by one plug-in type are documented in the chapter on that plug-in type. Below is a table of all suites available in Premiere Pro:

Suite Name	Relevant to Plug-in Type
Accelerated Render Invocation Suite	Exporters
App Info Suite	All
Application Settings Suite	All
Async File Reader Suite	Importers
Async Operation Suite	All
Audio Suite	Importers, Exporters
Captioning Suite	Device Controllers, Exporters, Transmitters
Clip Render Suite	Exporters
Deferred Processing Suite	Importers
Error Suite	All except Exporters starting in CS6
Export File Suite	Exporters
Export Info Suite	Exporters
Export Param Suite	Exporters
Export Progress Suite	Exporters
Export Standard Param Suite	Exporters
Exporter Utility Suite	Exporters
File Registration Suite	Importers, Transitions, Video Filters
Flash Cue Marker Data Suite	Exporters

GPU Device Suite	GPU Effects and Transitions
Image Processing Suite	All
Importer File Manager Suite	Importers
Legacy Suite	All
Marker Suite	Exporters
Media Accelerator Suite	Importers
Memory Manager Suite	All
Palette Suite	Exporters
Pixel Format Suite	All
Playmod Audio Suite	Transmitters
Playmod Device Control Suite	None (Deprecated)
Playmod Overlay Suite	Transmitters
Playmod Render Suite	None (Deprecated)
PPix Cache Suite	Importers
PPix Creator Suite	All
PPix Creator 2 Suite	All
PPix Suite	All
PPix 2 Suite	All
Quality Suite	None (Deprecated)
RollCrawl Suite	Exporters
Scope Render Suite	None (Deprecated)
Sequence Audio Suite	Exporters
Sequence Info Suite	Importers, Transitions, Video Filters
Sequence Render Suite	Exporters
Stock Image Suite	None (Deprecated)
String Suite	All
Threaded Work Suite	All
Time Suite	All
Transmit Invocation Suite	All
Video Segment Render Suite	Exporters
Video Segment Suite	Exporters
Window Suite	All

Acquiring and Releasing the Suites

All SweetPea suites are accessed through the Utilities Suite. Plug-ins can acquire the suites like so:

```
SPBasicSuite *SPBasic = NULL;
PrSDKPixelFormatSuite *PixelFormatSuite = NULL;
```

```
      SPBasic = stdParmsP->piSuites->utilFuncs->getSPBasicSuite();
      if (SPBasic)
      {
      SPBasic->AcquireSuite (  kPrSDKPixelFormatSuite,
                               kPrSDKPixelFormatSuiteVersion,
                               (const void**)&PixelFormatSuite);
      }
```

Don't forget to release the suites when finished!

```
      if (SPBasic && PixelFormatSuite)
      {
      SPBasic->ReleaseSuite (  kPrSDKPixelFormatSuite,
                               kPrSDKPixelFormatSuiteVersion);
      }
```

Versioning

Generally from version to version, the changes made to a suite are additive, so it is recommended to work with the most recent version of a suite if possible. However the latest version of a suite may not be supported by older versions of Premiere Pro or other host applications. Attempting to acquire suites that are unsupported by the host application will result in a NULL pointer being returned from `AcquireSuite`.

For a plug-in to support multiple versions, it may choose to use a specific older version of the suite that is supported across those multiple versions. Alternatively, it may check the version of the host application (using the App Info Suite below), and use the new suites where available, or the older suites when running in an older version. To acquire a specific older version of a suite, rather than requesting `kPrSDKPixelFormatSuiteVersion` in the example above, use a specific version number instead.

App Info Suite

Useful for plug-i that are shared between different applications, such as After Effects plug-ins, Premiere exporters, transmitters, and importers, where it may be important to know which host, version, or language the plug-in is currently running in. Note that this suite is not available to AE effects running in AE.

This suite provides the host application and version number. For a version such as 6.0.3, it will return major = 6, minor = 0, and patch = 3. See PrSDKAppInfoSuite.h.

Starting in version 2 of the suite, introduced in CC, the suite has a new selector to retrieve the build number. SpeedGrade CC supports this suite starting with the July 2013 update.

In version 3, starting in CC 2014, the suite has a new selector to retrieve the language as a NULL-terminated string identifying the locale used in the host application. For example: “en_US”, “ja_JP”, “zh_CN”.

Application Settings Suite

New in CS4. This suite provides calls to get the scratch disk folder paths defined in the current project, where the captured files and preview files are created. It also provides a call to get the project file path. All paths are passed back as PrSDKStrings. Use the new String Suite to extract the strings to UTF-8 or UTF-16. See PrSDKApplicationSettingsSuite.h.

Audio Suite

Calls to convert to and from the native audio format used by the Premiere API, at various bit depths. See PrSDKAudioSuite.h.

Captioning Suite

This suite enables a device controller, exporter, player, or transmitter to get the closed captioning data attached to a sequence. This suite provides the data in either Scenarist (CEA-608, *.scc) and MacCaption (CEA-708, *.mcc) formats. In the case of CEA-708, it includes not just the text to display, but it’s also the position information, and background, font, etc. If the transmitter or player just wants to overlay the captioning data on a frame, it can use the Playmod Overlay Suite instead.

Clip Render Suite

New in 2.0. Use this suite in the player or renderer, to request source frames directly from the importer. There are calls to find the supported frame sizes and pixel formats, so that the caller can make an informed decision about what format to request. Frames can be retrieved synchronously or asynchronously. Asynchronous requests can be cancelled, for example if the frames have passed their window of playback. See PrSDKClipRenderSuite.h.

Starting in CS4, this suite includes calls to find any custom pixel format supported by a clip, and to get frames in those custom pixel formats.

An exporter can use this suite to request frames from the renderer in a compressed pixel format.

Error Suite

Uses a single callback for errors, warnings, and info. This callback will activate a flashing icon in the lower left-hand corner of the main application window, which when clicked, will open up the new Events Window containing the error information. See PrSDKErrorSuite.h.

Starting in version 3 of the suite, introduced in CS4, the suite supports UTF-16 strings.

Starting in CS6, exporters should use the Exporter Utility Suite to report events.

File Registration Suite

Used for registering external files (such as textures, logos, etc) that are used by a plug-in instance but do not appear as footage in the Project Window. Registered files will be taken into account when trimming or copying a project using the Project Manager. See PrSDKFileRegistrationSuite.h.

Flash Cue Marker Data Suite

New in CS4. Specific utilities to read Flash cue points. Use in conjunction with the Marker Suite. See PrSDKFlashCueMarkerDataSuite.h.

Image Processing Suite

New in CS5. Various calls to get information on pixel formats and process frames. The `ScaleConvert()` call is the way to copy-convert from a buffer of any supported pixel format to a separate memory buffer.

In version 2, new in CS5.5, we have added `StampDVFrameAspect()`, which allows a plug-in to set the aspect ratio of a DV frame. This was added to supplement `ScaleConvert()`, which doesn't have an aspect ratio parameter.

Marker Suite

New in CS4. New way to read markers of all types. See PrSDKMarkerSuite.h.

Memory Manager Suite

New in Premiere Pro 2.0. Calls to allocate and deallocate memory, and to reserve an amount of memory so that it is not used by the host. See PrSDKMemoryManagerSuite.h.

In CS6, the suite is now at version 4. `AdjustReservedMemorySize` provides a way to adjust the reserved memory size relative to the current size. This may be easier for the plug-in, rather than maintaining the absolute memory usage and updating it using the older `ReserveMemory` call.

ReserveMemory

A plug-in instance can call `ReserveMemory` as a request to reserve space so that Premiere's media cache does not use it. Each time `ReserveMemory` is called, it updates Premiere Pro on how many bytes the plug-in instance is currently reserving. The amount specified is absolute, rather than cumulative. So to release any reserved memory to be made available to Premiere Pro's media cache, call it with a size of 0. However, it's not needed to reset this when exporters are destructed on *exSDK_EndInstance*, since the media manager will be deleting all the references anyways.

`ReserveMemory` changes the maximum size of Premiere's Media Cache. So if the cache size starts at 10 GB, and you reserve 1 GB, then the cache will not grow beyond 9 GB. `ReserveMemory` will reserve a different amount of memory, depending on the amount of available memory in the system, and what other plug-in instances have already reserved. The media cache needs a minimum amount of memory to play audio, render, etc.

Starting in version 2 of the suite, introduced in CS4, there are calls to allocate/deallocate memory. This is necessary for exporters, which are not passed the legacy `memFuncs`.

Pixel Format Suite

See the table of supported pixel formats. `GetBlackForPixelFormat` returns the minimum (black) value for a given pixel format. `GetWhiteForPixelFormat` returns the maximum (white) value for a given pixel format. Pixel types like YUYV actually contain a group of two pixels to specify a color completely, so the data size returned in this case will be 4 bytes (rather than 2). This call does not support MPEG-2 planar formats.

`ConvertColorToPixelFormattedData` converts an BGRA/ARGB value into a value of a different pixel type. These functions are not meant to convert entire frames from one colorspace to another, but may be used to convert a single color value from a filter color picker or transition border. To convert frames between pixel formats, see the Image Processing Suite.

New in Premiere Pro 4.0.1, `MAKE_THIRD_PARTY_CUSTOM_PIXEL_FORMAT_FOURCC()` defines a custom pixel format.

Playmod Overlay Suite

New in CS5.5. A transmitter can ask Premiere Pro to render the overlay for a specific time. As of CS6, this is only used for closed captioning.

To render the closed captioning overlay, it is not necessary to know anything about the closed captioning data, whether it is CEA-608 or CEA-708. `RenderImage` will simply produce a `PPixHand`.

The reason why it's not called Closed Captioning Overlay Suite is because going forward we want to use it as a general suite that provides all kinds of overlays. That way, when we add more overlay types in the future, you don't need to worry about updating your player each time to mirror the implementation on your side. In the future, we will likely use this same suite to render static overlays, such as safe areas. To support those, even if `VariesOverTime` returns false, you can call HasVisibleRegions at time 0.

Version 2 in CC 2014 removes `CalculateVisibleRegions().`

RenderImage

Render the overlay into an optionally provided BGRA `PPixHand`. `RenderImage` does not composite the overlay onto an existing frame, it just renders the overlay into the visible regions. After rendering the overlay at the player's display size, you will then need to composite that result over the frame.

If the user has zoomed the video, it could be wasteful to render a full-sized overlay image and then scale it. For better performance, the overlay can be rendered at the actual display size. The `inDisplayWidth`, `inDisplayHeight` and `inLogicalRegion` parameters provide this extra information needed to optimize for scaling in the UI.

As an example, let's say the sequence is 720x480 at 0.9091 PAR, and the Sequence Monitor is set to show the full frame at square PAR. Set `inLogicalRegion` to (0, 0, 720, 480), and `inDisplayWidth` to 654 and `inDisplayHeight` to 480.

If the Monitor zoom level was set to 50%, then the `inLogicalRegion` should stay the same, but display width and height should be set to 327x240. If zoomed to 200%, display width and height should be set to 1308x960. To pan around (as opposed to showing the entire frame), the logical region should be adjusted to represent the part of the sequence frame currently being displayed.

```
prSuiteError (*RenderImage)(
     PrPlayID       inPlayID,
     PrTime         inTime,
     const prRect*  inLogicalRegion,
     int            inDisplayWidth,
     int            inDisplayHeight,
     prBool         inClearToTransparentBlack,
     PPixHand*      ioPPix);
```

Parameter	Description
`inLogicalRegion`	The non-scaled region of the source PPix to overlay
`inDisplayWidth`	Width and height of `PPix`, if provided in `ioPPix`, scaled to account for Monitor zoom and PAR
`inDisplayHeight`	
`inClearToTransparentBlack`	If `kPrTrue`, the frame will first be cleared to transparent black before render
`ioPPix`	The frame into which to draw the overlay. If NULL, the host will allocate the `PPix`. If provided, the `PPix` must be BGRA, square pixel aspect ratio, and sized to `inDisplayWidth` & `inDisplayHeight`.

GetIdentifier

```
prSuiteError (*GetIdentifier)(
     PrPlayID       inPlayID,
     PrTime         inTime,
     const prRect*  inLogicalRegion,
     int            inDisplayWidth,
     int            inDisplayHeight,
     prBool         inClearToTransparentBlack,
     prPluginID*    outIdentifier);
```

HasVisibleRegions

```
prSuiteError (*HasVisibleRegions)(
     PrPlayID       inPlayID,
     PrTime         inTime,
     const prRect*  inLogicalRegion,
     int            inDisplayWidth,
     int            inDisplayHeight,
     prBool*        outHasVisibleRegions);
```

VariesOverTime

```
prSuiteError (*VariesOverTime)(
     PrPlayID       inPlayID,
     prBool*        outVariesOverTime);
```

PPix Cache Suite

Used by an importer, player, or renderer to take advantage of the host application's PPix cache. See PrSDKPPixCacheSuite.h.

Starting in version 2 of this suite, introduced in Premiere Pro 4.1, `AddFrameToCache` and `GetFrameFromCache` now have two extra parameters, `inPreferences` and `inPreferencesLength`. Now frames are differentiated within the cache, based on the importer preferences, so when the preferences change, the host will not use the old frame when it gets a frame request.

Version 4, new in CS5.0.3, adds `ExpireNamedPPixFromCache`() and `ExpireAllPPixesFromCache`(), which allow a plug-in to remove one or all `PPix`es from the Media Cache, which can be useful if the media is changing due to being edited in a separate application.

To expire an individual frames expired using `ExpireNamedPPixFromCache`(), the identifier must be known. The plug-in may specify an identifier using `AddNamedPPixToCache`(). If a frame is in the cache with multiple names, and you expire any one of those names, then the frame will be expired. Alternatively, for rendered frames, the identifier may be retrieved using `GetIdentifierForProduceFrameAsync`() in the Video Segment Render Suite.

Clearing the cache will not interfere with any outstanding requests, because each request holds dependencies on the needed frames.

Version 5, new in CS5.5, adds the new color profile-aware calls `AddFrameToCacheWithColorProfile`() and `GetFrameFromCacheWithColorProfile`().

Version 6, new in CC 2014, adds `AddFrameToCacheWithColorProfile2()` and `GetFrameFromCacheWithColorProfile2()`, which are the same as the ones added in version 5 with the addition of a `PrRenderQuality` parameter.

PPix Creator Suite

Includes callbacks to create and copy PPixs. See also the PPix Creator 2 Suite.

CreatePPix

Creates a new PPix. The advantage of using this callback is that frames allocated are accounted for in the media cache, and are 16-byte aligned. `ppixNew` and `newPtr` don't allocate memory in the media cache, or perform any alignment.

```
prSuiteError (*CreatePPix)(
     PPixHand*           outPPixHand,
     PrPPixBufferAccess  inRequestedAccess,
     PrPixelFormat       inPixelFormat,
     const prRect*       inBoundingRect);
```

Parameter	Description
`PPixHand *outPPixHand`	The new `PPix` handle if the creation was successful. NULL otherwise.
`PrPPixBufferAccess inRequestedAccess`	Requested pixel access. Read-only is not allowed (doesn't make sense). `PrPPixBufferAccess` values are defined in PPix Suite.
`PrPixelFormat inPixelFormat`	The pixel format of this `PPix`

ClonePPix

Clones an existing `PPix`. It will ref-count the `PPix` if only read access is requested and the `PPix` to copy from is read-only as well, otherwise it will create a new one and copy.

```
prSuiteError (*ClonePPix)(
     PPixHand            inPPixToClone,
     PPixHand*           outPPixHand,
     PrPPixBufferAccess  inRequestedAccess);
```

Parameter	Description
`PPixHand inPPixToClone`	The `PPix` to clone from.
`PPixHand *outPPixHand`	The new `PPix` handle if the creation was successful. NULL otherwise.
`PrPPixBufferAccess inRequestedAccess`	Requested pixel access. Only read-only is allowed right now. `PrPPixBufferAccess` values are defined in PPix Suite.

PPix Creator 2 Suite

More callbacks to create PPixs, including raw PPixs. Starting in version 2 of this suite, introduced in Premiere Pro 4.0.1, there is a new `CreateCustomPPix` call to create a PPix in a custom pixel format. See PrSDKPPixCreator2Suite.h.

PPix Suite

Callbacks and enums pertaining to PPixs. See also PPix 2 Suite.

PrPPixBufferAccess

Can be either `PrPPixBufferAccess_ReadOnly`, `PrPPixBufferAccess_WriteOnly`, or `PrPPixBufferAccess_ReadWrite`.

Dispose

This will free this PPix. The PPix is no longer valid after this function is called.

```
prSuiteError (*Dispose)(
     PPixHand inPPixHand);
```

Parameter	Description
`PPixHand inPPixHand`	The `PPix` handle to dispose.

GetPixels

This will return a pointer to the pixel buffer.

```
prSuiteError (*GetPixels)(
     PPixHand            inPPixHand,
     PrPPixBufferAccess  inRequestedAccess,
     char**              outPixelAddress);
```

Parameter	Description
`PPixHand inPPixHand`	The `PPix` handle to operate on.
`PrPPixBufferAccess inRequestedAccess`	Requested pixel access. Most `PPixs` do not support write access modes.

Parameter	Description
`char** outPixelAddress`	The output pixel buffer address. May be NULL if the requested pixel access is not supported.

GetBounds

This will return the bounding rect.

```
prSuiteError (*GetBounds)(
     PPixHand  inPPixHand,
     prRect*   inoutBoundingRect);
```

Parameter	Description
`PPixHand inPPixHand`	The PPix handle to operate on.
`prRect* inoutBoundingRect`	The address of a bounding rect to be filled in.

GetRowBytes

This will return the row bytes of the `PPix`.

```
prSuiteError (*GetRowBytes)(
     PPixHand       inPPixHand,
     csSDK_int32*   outRowBytes);
```

Parameter	Description
`PPixHand inPPixHand`	The PPix handle to operate on.
`csSDK_int32* outRowBytes`	Returns how many bytes must be added to the pixel buffer address to get to the next line.

GetPixelAspectRatio

This will return the pixel aspect ratio of this `PPix`.

```
prSuiteError (*GetPixelAspectRatio)(
     PPixHand       inPPixHand,
     csSDK_uint32*  outPixelAspectRatioNumerator,
     csSDK_uint32*  outPixelAspectRatioDenominator);
```

Parameter	Description
`PPixHand inPPixHand`	The PPix handle to operate on.
`PrPixelFormat* outPixelFormat`	Returns the pixel format of this PPix

GetUniqueKey

This will return the unique key for this `PPix`. Returns error if the buffer size is too small (call `GetUniqueKeySize` to get the correct size). Returns error if the key is not available. Returns success if the key data was filled in.

```
prSuiteError (*GetUniqueKey)(
     PPixHand       inPPixHand,
     unsigned char* inoutKeyBuffer,
     size_t         inKeyBufferSize);
```

Parameter	Description
`PPixHand inPPixHand`	The `PPix` handle to operate on.
`unsigned char* inoutKeyBuffer`	Storage for the key to be returned.
`size_t inKeyBufferSize`	Size of buffer

GetUniqueKeySize

This will return the unique key size. This will not change for the entire run of the application.

```
prSuiteError (*GetUniqueKeySize)(
     size_t* outKeyBufferSize);
```

Parameter	Description
`size_t* outKeyBufferSize`	Returns the size of the `PPix` unique key.

GetRenderTime

This will return the render time for this `PPix`.

```
prSuiteError (*GetRenderTime)(
     PPixHand       inPPixHand,
     csSDK_int32*   outRenderMilliseconds);
```

Parameter	Description
`PPixHand inPPixHand`	The PPix handle to operate on.
`csSDK_int32* outRenderMillisec-onds`	Returns the render time in milliseconds. If the frame was cached, the time will be zero.

PPix 2 Suite

A call to get the size of a PPix. Starting in version 2 of this suite, introduced in CS4, there is a new `GetYUV420PlanarBuffers` call to get buffer offsets and rowbytes of YUV_420_MPEG2 pixel formats. See PrSDKPPix2Suite.h.

RollCrawl Suite

Used by a player or renderer to obtain the pixels for a roll/crawl. The player or render can then move and composite it using accelerated algorithms or hardware. See PrSDKRollCrawlSuite.h.

Sequence Info Suite

New in CS4. Calls to get the frame size and pixel aspect ratio of a sequence. This is useful for importers, transitions, or video filters, that provide a custom setup dialog with a preview of the video, so that the preview frame can be rendered at the right dimensions. See PrSDKSequenceInfoSuite.h.

Version 2, new in CS5.5, adds `GetFrameRate`().

Version 3, new in CC, adds `GetFieldType`(), `GetZeroPoint`(), and `GetTimecodeDropFrame`().

String Suite

New in CS4. Calls to allocate, copy, and dispose of `PrSDKString`s. See PrSDKStringSuite.h.

Threaded Work Suite

New in CS4. Calls to register and queue up a threaded work callback for processing on a render thread. If you queue multiple times, it is possible for multiple threads to call your callback. If this is a problem, you'll need to handle this on your end.

Time Suite

A SweetPea suite that includes the following structure, callbacks, and enum:

pmPlayTimebase

Member	Description
`csSDK_uint32 scale`	rate of the timebase
`csSDK_int32 sampleSize`	size of one sample
`csSDK_int32 fileDuration`	number of samples in file

PrVideoFrameRates

Member	Description
`kVideoFrameRate_24Drop`	24000 / 1001
`kVideoFrameRate_24`	24
`kVideoFrameRate_PAL`	25
`kVideoFrameRate_NTSC`	30000 / 1001
`kVideoFrameRate_30`	30
`kVideoFrameRate_PAL_HD`	50
`kVideoFrameRate_NTSC_HD`	60000 / 1001
`kVideoFrameRate_60`	60
`kVideoFrameRate_Max`	0xFFFFFFFF

GetTicksPerSecond

Get the current ticks per second. This is guaranteed to be constant for the duration of the runtime.

```
prSuiteError (*GetTicksPerSecond)(
     PrTime* outTicksPerSec);
```

GetTicksPerVideoFrame

Get the current ticks in a video frame rate. `inVideoFrameRate` may be any of the `PrVideoFrameRates` enum.

```
prSuiteError (*GetTicksPerVideoFrame)(
     PrVideoFrameRates   inVideoFrameRate,
     PrTime*             outTicksPerFrame);
```

GetTicksPerAudioSample

Get the current ticks in an audio sample rate. Returns `kPrTimeSuite_RoundedAudioRate` if the requested audio sample rate is not an even divisor of the base tick count and therefore times in this rate will not be exact. Returns `kPrTimeSuite_Success` if otherwise.

```
prSuiteError (*GetTicksPerAudioSample)(
     float      inSampleRate,
     PrTime*    outTicksPerSample);
```

Video Segment Render Suite

This suite uses the built-in software path for rendering, and supports subtree rendering. This means the plug-in can ask the host to render a part of the segment, and then still handle the rest of the rendering. This is useful if, for example, one of the layers has an effect that the plug-in cannot render itself. The plug-in can have the host render that layer, but then handle the other layers along with the compositing.

In version 2, new in CS5.5, the new call `SupportsInitiateClipPrefetch`() can be used to query whether or not a clip supports prefetching.

In version 3, new in CS6, the function signatures have been modernized, using `inSequenceTicksPerFrame` rather than `inFrameRateScale` and `inFrameRateSampleSize`.

Video Segment Suite

This suite provides calls to parse a sequence and get details on video segments. All the queryable node properties are in PrSDKVideoSegmentProperties.h. These properties will be returned as `PrSDKString`s, and should be managed using the String Suite. The segments provide a hash value that the caller can use to quickly determine whether or not a segment has changed. This hash value can be maintained even if a segment is shifted in time

In version 4, new in CS5.5, the new call `AcquireNodeForTime`() passes back a segment node for a requested time. There are also a few new properties for media nodes: `StreamIsContinuousTime`, `ColorProfileName`, `ColorProfileData`, and `ScanlineOffsetToImproveVerticalCentering`.

In version 5, new in CC, a new video segment property is available: `Effect_ClipName`.

In version 6, new in CC 2014, `AcquireFirstNodeInTimeRange()` and `AcquireOperatorOwnerNodeID()` were added, along with the new node type `kVideoSegment_NodeType_AdjustmentEffect`.

The basic structure of the video segments is that of a tree structure. There is a Compositor node with n inputs. Each of those inputs is a Clip node, which has one input which is a Media node, and it also has n Operators, which are effects.

So, a simple example, three clips in a stack, the top one with three effects looks like this:

```
Segment
     Compositor Node
          Clip Node
               Media Node (bottom clip)
          Clip Node
               Media Node (middle clip)
          Clip Node
               Media Node (top clip)
               Clip Operators (Blur, Color Corrector, Motion)
```

To get a good idea of the segment structure, try the SDK player, create a sequence using the SDK Editing Mode, and watch the text overlay in the Sequence Monitor as you perform edits.

See PrSDKVideoSegmentSuite.h and PrSDKVideoSegmentProperties.h.

Window Suite

New in CS4. This is the new preferred way to get the handle of the mainframe window, especially for exporters, who don't have access to the legacy piSuites.

Legacy Callback Suites

piSuites

These callbacks are available to all plug-ins, although many of these callbacks are only appropriate for specific plug-in types.

```
typedef struct {
     int piInterfaceVer;
     PlugMemoryFuncsPtr       memFuncs;
     PlugWindowFuncsPtr       windFuncs;
     PlugppixFuncsPtr         ppixFuncs;
     PlugUtilFuncsPtr         utilFuncs;
     PlugTimelineFuncsPtr     timelineFuncs;
} piSuites, *piSuitesPtr;
```

Member	Description
`piInterfaceVer`	API version Premiere Pro CS4 - `PR_PISUITES_VERSION_9` Premiere Pro CS3 - `PR_PISUITES_VERSION_8` Premiere Pro 2.0 - `PR_PISUITES_VERSION_7` Premiere Pro 1.5.1 - `PR_PISUITES_VERSION_6` Premiere Pro 1.5 - `PR_PISUITES_VERSION_5` Premiere Pro 1.0 - `PR_PISUITES_VERSION_4` Premiere 6.x - `PR_PISUITES_VERSION_3` Premiere 5.1 - `PR_PISUITES_VERSION_2` Premiere 5.0 - `PR_PISUITES_VERSION_1`
`memfuncs`	Pointer to memory functions
`windFuncs`	Pointer window functions
`ppixFuncs`	Pointer PPix functions
`utilFuncs`	Pointer to utility functions. In the utilFuncs, the getSPBasicSuite callback provides access to the "SweetPea" Suites, which are used for most of the newer functions.
`timelineFuncs`	Pointer to timeline functions

Memory Functions

Memory and handle allocation. Where possible, use the PPix Creator Suite for `PPix`-specific allocation.

Strings passed to and from Premiere in API structures are always null-terminated C strings.

Function	Description
`newPtr`	Allocates a block of memory, returns a pointer to the new block. `char* newPtr (csSDK_uint32 size);`
`newPtrClear`	Equivalent to `newPtr`, but initializes the memory to 0. `char* newPtrClear (csSDK_uint32 size);`

`setPtrSize`	Resizes an allocated memory block.
	
	`void setPtrSize (`
	`     PrMemoryPtr *ptr,`
	`     csSDK_uint32 newsize);`

`getPtrSize`	Returns size in bytes of an allocated memory block. `csSDK_int32 getPtrSize (char *ptr);`

Function	Description
`disposePtr`	Frees an allocated memory block. `void disposePtr (char *ptr);`
`newHandle`	Allocates a block of memory, returning a handle to it. `char** newHandle (csSDK_uint32 size);`
`newHandleClear`	Equivalent to newHandle, but initializes the memory to 0. `char** newHandleClear (csSDK_uint32 size);`

`setHandleSize`	Resizes an allocated memory handle.
	
	`csSDK_int16 setHandleSize (`
	`     char **PrMemoryHandle,`
	`     csSDK_uint32 newsize);`

`getHandleSize`	Returns the size (in bytes) of an allocated block.
	
	`csSDK_int32 getHandleSize (`
	`     char **PrMemoryHandle);`

`disposeHandle`	Disposes of a previously allocated handle. `void disposeHandle (char **PrMemoryHandle);`
`lockHandle` `unlockHandle`	These legacy functions are deprecated and should no longer be used.

Window Functions

Window management routines. Superceded by the Window Suite.

Function	Description
`updateAllWindows`	Updates all windows. Windows only, doesn't work on Mac OS. `void updateAllWindows (void);`
`getMainWnd`	Returns the main application `HWND`. `void getMainWnd (void);`

PPix Functions

Used to manipulate a `PPix`. Superceded by the PPix Creator Suite for PPix allocation and the

PPix Suite for general PPix functions.

Function	Description
`ppixGetPixels`	Returns a pointer to the array of pixels contained in a `PPix`. `char* ppixGetPixels (PPixHand pix);`

`ppixGetBounds`	Returns the bounds of a `PPix`.
	
	`void ppixGetBounds (`
	`     PPixHand pix;`
	`     prRect *bounds);`

`ppixGetRowbytes`	Returns the `rowbytes` of a `PPix` so you can properly parse the pixels returned by `ppixGetPixels`. `int ppixGetRowbytes (PPixHand pix);`
`ppixNew`	Allocates and returns a handle to a new `PPix`, with specified `bounds`. Since this is an older call, the pixel format is hardcoded to `BGRA_4444_8u`. `PPixHandle ppixNew (prRect *bounds);`
`ppixDispose`	Frees a `PPixHand`. `void ppixDispose (PPixHand pix);`
`ppixLockPixels` `ppixUnlockPixels`	These legacy functions are deprecated and should no longer be used.

`ppixGetPixelAspectRatio`	Passes back the pixel aspect ratio of a `PPixHand`. Premiere populates the longs with the PAR numerator and denominator.
	
	`int ppixGetPixelAspectRatio (`
	`     PPixHand pix,`
	`     csSDK_uint32 *num,`
	`     csSDK_uint32 *den);`

`ppixGetAlphaBounds`	Passes back the alpha bounds of a `PPixHand`.
	
	`void ppixGetAlphaBounds (`
	`     PPixHand pix,`
	`     prRect *alphaBounds);`

Utility Functions

Function	Description
`getSerialNumber`	Passes back Premiere's serial number. `void getSerialNumber (char* buffer);` `buffer` - must be at least 40 characters long.

`getFileTimebase`	Passes back a file's timebase in a TDB_TimeRecord (allocated by the plug-in). If the file is already in the sequence, it is preferable to get a file's timebase using the Video Segment Suite to get the `kVideoSegmentProperty_Media_StreamFrameRate`.
	
	Note: Know your formats. Don't ask an audio only format for video, you may get unexpected results.
	
	`csSDK_int32 getFileTimebase (`
	`     prFileSpec *filespec,`
	`     csSDK_int32 audioOnly,`
	`     TDB_TimeRecord *result);`
	
	`filespec` - description of the file, use before `getFileVideo`
	`audioOnly` - if non-zero, return the audio timebase. If zero, return the video timebase.
	`result` - the returned timebase

`getFileVideo`	Gets a frame of video (at a specified time) from a file. If the file is already in the sequence, it is preferable to get a file's video using the Clip Render Suite.
	
	`csSDK_int32 getFileVideo (`
	`     prFileSpec     *filespec,`
	`     csSDK_int32              frame,`
	`     PPixHand       thePort,`
	`     prRect         *bounds,`
	`     csSDK_int32              flags);`
	
	`filespec` - the description of the file
	`frame` - the frame to retrieve
	`thePort` - where the frame will be delivered, allocate prior to calling
	`bounds` - the boundary of the port
	`flags` - unused

Function	Description

`getFileVideoBounds`	Passes back the bounds of a file. If the file is already in the sequence, it is preferable to get a file's video bounds using the Clip Render Suite.
	
	`csSDK_int32 getFileVideoBounds (`
	`     prFileSpec     *filespec,`
	`     prRect         *bounds);`

`getSPBasicSuite`	This very important call returns the SweetPea suite that allows plug-ins to acquire and release all other SweetPea suites. `SPBasicSuite* getSPBasicSuite();`

`getFileExtString`	Passes back the list of valid entensions/filter strings given a class of media (see file types constants below).
	
	`csSDK_int32 (*plugGetFileExtStringFunc)(`
	`     csSDK_uint32 fileTypes,`
	`     char *inBuffer,`
	`     csSDK_uint32 inBufferSize);`
	
	`kFileTypes_Still` - still media
	`kFileTypes_AudioOnly` - audio-only media
	`kFileTypes_AudioVideo` - audio and video media
	`kFileTypes_AllNoIntrinsics` - all importable media types via importer plug-ins (no prproj, txt, etc)

Timeline Functions

Function	Description

`getClipVideo`	Superceded by the Clip Render Suite, which provides asynchronous import.
	
	Retrieves a frame from a clip in a segment tree returned from the Video Segment Suite. It can be used by to retrieve and store a still frame, such as a title, for playback. This call is expensive; use it carefully.
	
	`csSDK_int32 getClipVideo (`
	`     csSDK_int32    frame,`
	`     PPixHand       thePort,`
	`     prRect         *bounds,`
	`     csSDK_int32    flags,`
	`     PrClipID       clipData);`
	
	`frame` - the frame number you're requesting
	`thePort` - allocate using the PPix Creator Suite before calling
	`bounds` - the boundaries of video to return
	`flags` - either `kGCVFlag_UseFilePixelAspectRatio` or 0. Setting it to `kGCVFlag_UseFilePixelAspectRatio` will return a `PPix` stamped with the PAR of the file. Setting it to 0 will return a `PPix` adjusted to the PAR of the project and stamped accordingly. It scales, but does not stretch the `PPix` to fit the destination `PPix` that is passed in. So if the destination `PPix` is larger than the frame asked for, the frame will maintain its frame aspect ratio, letterboxing or pillarboxing the frame with transparent black. To import a frame at its native dimensions, use `getClipVideoBounds`, allocate the destination PPix using the dimensions returned, and pass the PPixHand and the dimensions into `getClipVideo`. If the frame size is not the same as the sequence size, the frame must be positioned in the composite by the plug-in.
	`clipData` - the `clipData` handle found in `prtFileRec`

Function	Description

`getWorkArea`	Passes back two `long`s with the start and end of the current work area (read-only). Set `timelineData` to the timelineData of the current sequence.
	
	`csSDK_int32 getWorkArea (`
	`     PrTimelineID   timelineData,`
	`     csSDK_int32    *workAreaStart,`
	`     csSDK_int32    *workAreaEnd);`

`getCurrentTimebase`	Passes back the current timebase of the timeline (`scale` + `sampleSize`).
	
	`void getCurrentTimebase(`
	`     PrTimelineID   timelineData,`
	`     csSDK_uint32   *scale,`
	`     csSDK_int32    *sampleSize);`
	
	`timelineData` - the `timelineData` of the current sequence
	`scale` - the sequence `scale`
	`sampleSize` - the sequence `sampleSize`

`getCurrentPos`	Returns the position of the current time indicator (the position bar set by the user). If (-1) is returned, the position bar in the timeline is not present.
	
	`csSDK_int32 getCurrentPos(`
	`     PrTimelineID timelineData);`
	
	`timelineData` - the `timelineData` of the current sequence

Function	Description

`getPreviewFrameEx`	Gets a fully rendered frame from the timeline (all layers). Used by video filters and transitions for previews in a modal setup dialog. If the return value is -1, an error occurred, but if it is 0, the callback has returned safely. Exporters rendering final movies should NOT use this callback.
	
	`csSDK_int32 getPreviewFrameEx(`
	`PrTimelineID      timelineData,`
	`csSDK_int32       inFrame,`
	`PPixHand *        outRenderedFrame,`
	`const prRect *    inFrameRect,`
	`PrPixelFormat *   inRequestedPixelFormatArray`
	`csSDK_int32       inRequestedPixelFormatArrayCount,`
	`csSDK_uint32      inPixelAspectRatioNumerator,`
	`csSDK_uint32      inPixelAspectRatioDenominator,`
	`bool              inAlwaysRender);`
	
	`timelineData` - The `timelineData` of the current sequence. Pass a timeline handle as provided in `EffectRecord`, `VideoRecord`, `compDoCompileInfo`, or `imGetPrefsRec`.
	`inFrame` - The frame to get, specified in the current timebase. If a `timelineData` handle is specified (first param above), this frame will be relative to the start of the sequence.
	`outRenderedFrame` - The destination buffer. Allocate prior to this call by the plug-in using the PPix Suite. Released by the caller before returning.

`getClipVideoBounds`	Passes back the dimensions of a clip in a sequence. For rolling/crawling titles, use the Roll/Crawl Suite to get the dimensions instead.
	
	`csSDK_int32 getClipVideoBounds (`
	`      PrClipID          inClipData,`
	`      prRect            *outBounds,`
	`      csSDK_uint32      *outPixelAspectRatioNumerator,`
	`      csSDK_uint32      *outPixelAspectRatioDenominator);`

Function	Description

`getClipVideoEx`	Superceded by the Clip Render Suite, which provides asynchronous import.
	
	Retrieves a frame from a clip in a segment tree returned from the Video Segment Suite. It can be used by to retrieve and store a still frame, such as a title, for playback. This call is expensive; use it carefully.
	
	`csSDK_int32 getClipVideoEx (`
	`    csSDK_int32            inFrame,`
	`    PPixHand               *outRenderedFrame,`
	`    const prRect           *inFrameRect,`
	`    const PrPixelFormat    *inRequestedPixelFormatArray,`
	`    csSDK_int32            inRequestedPixelFormatArrayCount,`
	`    csSDK_uint32           inPixelAspectRatioNumerator,`
	`    csSDK_uint32           inPixelAspectRatioDenominator,`
	`    PrClipID               inClipData);`
	
	`inFrame` - the frame number you're requesting, in the timebase of the clip
	`outRenderedFrame` - Allocated by the host. The plug-in should dispose of the `PPixHand` when done
	`inFrameRect` - the boundaries of video to return. To import a frame at its native dimensions, use `getClipVideoBounds`. If the frame size is not the same as the sequence size, the frame must be positioned in the composite by the plug-in.
	`inClipData` - the `PrClipID` from the video segment

Bottleneck Functions

The pointer to the legacy bottleneck functions is passed only to transitions and video filters. These functions are not exposed for other plug-in types. These functions are not aware of different pixel formats, and are intended only for 8-bit BGRA processing.

Sample usage:

```
((*theData)->bottleNecks->StretchBits) (*srcpix,
                                         *dstpix,
                                         &srcbox,
                                         &srcbox,
                                         0,
                                         NULL);
```

Function	Description

`StretchBits`	Stretches and copies an image, including the alpha channel. When the destination is larger than the source, it performs bilinear interpolation for smooth scaling.
	
	`void StretchBits (`
	`     PPixHand       srcPix,`
	`     PPixHand       dstPix,`
	`     prRect         srcRect,`
	`     prRect         dstRect,`
	`     int            mode,`
	`     prRgn          rgn);`
	
	`StretchBits` only works on 8-bit `PPix`s. `srcRect` is the area of the source `PPix` to copy; `dstRect` is used to scale the copy. Valid `modes` are `cbBlend`, `cbInterp`, and `cbMaskHdl`
	
	For `cbBlend`, the low byte of the mode defines the amount of blend between the source and destination in a range of 0-255.
	
	Example:
	To blend 30% of the source with the destination, use `cbBlend | (30*255/100)`.
	
	While much slower than `cbBlend`, `cbInterp` mode does bilinear interpolation when resizing a source `PPix` to a larger destination, result-ing in a much smoother image.
	
	`cbMaskHdl` tells `StretchBits` that `prRgn` is a handle to a 1-bit deep buffer the same size as the source and destination `PPix`s, to be used as a mask. Pass 0 for no clipping. The `prRgn` parameter is only used on Windows.

Function	Description

`DistortPolygon`	Maps the source rectangle to a four-point polygon in the destination.
	
	`void DistortPolygon (`
	`     PPixHand  src,`
	`     PPixHand  dest,`
	`     prRect    *srcbox,`
	`     prPoint   *dstpts);`
	
	When scaling up, `DistortPolygon` uses bilinear interpolation; it uses pixel averaging when scaling down.

`MapPolygon`	Maps a four-point src polygon into a four-point polygon (`dstpts`). If the source polygon is a rectangle, it is equivalent to `DistortPolygon`.
	
	`void MapPolygon (`
	`     PPixHand  src,`
	`     PPixHand  dest,`
	`     prPoint   *srcpts,`
	`     prPoint   *dstpts );`

`DistortFixed`	Equivalent to `DistortPolygon,` using fixed-point coordinates.
	
	`void DistortFixed (`
	`     PPixHand  src,`
	`     PPixHand  dest,`
	`     prRect    *srcbox,`
	`     LongPoint *dstpts);`

`FixedToFixed`	Equivalent to `MapPolygon,` using fixed-point coordinates.
	
	`void FixedToFixed (`
	`     PPixHand  src,`
	`     PPixHand  dest,`
	`     LongPoint *srcpts,`
	`     LongPoint *dstpts);`

Function	Description

`DoIndexMap`	Image map function.
	
	`void DoIndexMap (`
	`     char      *src,`
	`     char      *dst,`
	`     short     row,`
	`     short,    pixwidth,`
	`     short,    height,`
	`     char      *lookup1,`
	`     char      *lookup2,`
	`     char      *lookup3);`

`DoConvolve`	Convolution function.
	
	`void DoConvolve (`
	`     unsigned char  *src,`
	`     unsigned char  *dst,`
	`     short          *inmatrix,`
	`     short,         rowBytes,`
	`     short,         width,`
	`     short,         height);`

4 Hardware Integration

To integrate hardware with Premiere Pro, you may consider developing up to five types of plug-ins: importers, recorders, exporters, transmitters, and device controllers. Premiere Pro provides the user interface for the capture, timeline, monitor, and export panels; the plug-ins provide the functionality behind the interface.

Hardware Integration Components

Importers

Importers are used whenever frames of video or audio from a clip are needed. To give Premiere Pro the ability to read media that uses a new format or codec, develop an importer. See the Importers chapter for more information.

Recorders

Users may choose a recorder in Project > Project Settings > General > Capture Format. Recorders are used to grab frames from a hardware source and write them to a file, to be imported for editing. See the Recorders chapter for more information.

Exporters

Exporters are used whenever Premiere Pro renders preview files, or performs an export on a clip or sequence. To give Premiere Pro the ability to write media that uses a new format or codec, develop an exporter. The exporter used to render preview files in the timeline is set in Sequence > Sequence Settings > Preview File Format. The exporter used for exports is chosen when the user selects File > Export > Media > File Type. See the Exporters chapter for more information.

Transmitters

A transmitter handles the display of video on any external A/V hardware and secondary output. To give Premiere Pro the ability to play video out to hardware for preview and final playout, write a transmitter. See the Transmitters chapter for more information.

ClassID, Filetype and Subtype

All plug-in types that support media must identify unique classID, filetype, and subtype. These are all four character codes, or 'fourCCs'.

Identifier	Purpose
`filetype`	Identifies the plug-in's associated file type(s). Plug-ins create lists of filetypes they support.
`subtype`	Differentiates between files of the same filetype. Identifies the codec or compression to be used.
`classID`	With the new editing mode system starting in CS4, the classID is far less important. It is used as part of the identification for exporters in the Editing Mode XML. And plug-ins may share information with most other plug-ins running in the same process using the ClassData Functions below.

ClassData Functions

All plug-in types that support media can use these callbacks to share information associated with their `classID`.

For example, these plug-ins can confirm their hardware is present and operational using the ClassData functions. They all call `getClassData` during initialization. If `getClassData` returns 0, the module checks for and initialize the hardware. It then calls `setClassData` to store information about the current context. Use handles, not pointers, for storing info.

```
typedef struct {
     SetClassDataFunc setClassData;
     GetClassDataFunc getClassData;
} ClassDataFuncs, *ClassDataFuncsPtr;
```

Function	Description

`setClassData`	Writes class data, destroys previous data.
	
	`int setClassData (`
	`     unsigned int theClass`
	`     void *info);`
	
	`theClass` - the class being set. Use a unique 4-byte code.
	`info` - the class data to be set. It can be used as a pointer or a handle. Note that all plug-ins that share the data must use the same data structure.

`getClassData`	Retrieves the class data for the given class. `int getClassData (unsigned int theClass);` `theClass` - the class for which to retrieve data.

5 Importers

Importers provide video, audio and/or closed captioning from the media source. This source can be a single file, a set of files, a communication link between another application, etc.

Standard importers appear as choices in the File > Import dialog, in the Files of type drop-down menu. Importers can support movies, still images, series of still images, and/or audio. If your importer provides enhanced support for a format already supported by another importer that ships with Premiere, set a high value in `imImportInfoRec.priority` to give your importer the first opportunity to handle the file.

Synthetic importers synthesize source material, rather than reading from disk. They appear in the File > New menu.

Custom importers are a special type of synthetic importer, implemented to better support titlers. Custom importers can create files on disk; synthetic importers don't. Custom importers either create new media or import existing media handled by the importer. After the file is created, the media is treated like a standard file by the host application. Additionally, the media can be modified by the importer when the user double-clicks on it in the Project Panel.

Importer Type	Reads from disk	Creates clips	Menu Location
Standard	Yes	No	File > Import
Synthetic	No	Yes	File > New
Custom	Yes	Yes	File > New File > Import

If you've never developed an importer before, you can skip the What's New sections, and go directly to Getting Started.

What's New

What's New in Premiere Pro CC 2019 (13.0)

We've begun adding colorspace support to Premiere Pro's APIs, beginning with Importers.

What's New in Premiere Pro CC 2014

Importers can now choose the format they are rendering in, which allows importers to change pixel formats and quality based on criteria like enabled hardware and other Clip Source Settings, such as HDR. To handle the negotiation, implement *imSelectClipFrameDescriptor*.

`imSourceVideoRec` now includes a quality attribute. PPix Cache Suite is now at version 6, adding `AddFrameToCacheWithColorProfile2()` and `GetFrameFromCacheWithColorProfile2()`, which are the same as the ones added in version 5 with the addition of a `PrRenderQuality` parameter.

`imFileInfoRec8.highMemUsage` is no longer supported.

What's New in Premiere Pro CC October 2013 release?

`imInitiateAsyncClosedCaptionScanRec` now provides extra fields for the importer to fill in the estimated duration of all the captions. This is useful for certain cases where the embedded captions contain many frames of empty data.

What's New in Premiere Pro CC?

Starting in CC, importers can support closed captioning that is embedded in the source media. Note that Premiere Pro can also import and export captions in a sidecar file (e.g. .mcc, .scc, or .xml) alongside any media file, regardless of the media file format. This does not require any specific work on the importer side. The importer only needs to add support if it will support embedded closed captions.

Importers can now support audio beyond basic mono, stereo, and 5.1, without implementing multiple streams (existing importers do not need to be updated). The importer specifies a channel layout by implementing the new *imGetAudioChannelLayout* selector. Otherwise the channel layout will be assumed to be discrete.

The clip preferences are now passed with `imIndPixelFormatRec`, so that an importer can choose to return varying pixel formats depending on the Clip Source Settings.

What's New in Premiere Pro CS6.0.2?

This release adds more support for growing files by adding a new flag, `imFileInfoRec8.mayBeGrowing`.

What's New in Premiere Pro CS6?

Importers can now bring in stereoscopic footage as a single clip with separate left and right channels.

With some additional work, importers can now support growing files. The refresh rate for growing files is set by the user in Preferences > Media > Growing Files. The importer should get the refresh rate using the new call `GetGrowingFileRefreshInterval`() in the Importer File Manager Suite. It should call `RefreshFileAsync`() to refresh the file.

A new selector, *imQueryInputFileList*, was added to support Collect Files in After Effects for file types that use more than a single file. In `imImportInfoRec`, a new member, `canProvideFileList`, specifies whether the importer can provide a list of all files for a copy operation. If the importer does not implement this selector, the host will assume the media just uses a single file at the original imported media path.

The Media Accelerator Suite is now at version 4. `FindPathInDatabaseAndValidateContentState` provides a new way to find existing media accelerators, making sure they are up-to-date.

Importers can now choose whether or not they want to provide peak audio data on a clip-by-clip basis. The importer-wide setting still remains in `imImportInfoRec.canProvidePeakAudio`, but an importer can override the general setting by setting `imFileInfoRec8.canProvidePeakAudio` appropriately.

What's New in Premiere Pro CS5.5?

Importers can now support color management, when running in After Effects. The importer should set `imImageInfoRec.colorProfileSupport` to `imColorProfileSupport_Fixed`, and then describe the color profiles supported by the clip using the new *imGetIndColorProfile* selector. When importing the frame, specify the color profile in `imSourceVideoRec.selectedColorProfileName`. The PPix Cache Suite has been updated to differentiate between color profiles as well.

New `canProvidePeakAudio` flag to allow an importer to provide peak audio data by responding to *imGetPeakAudio*.

The new return value, `imRequiresProtectedContent`, allows an importer to be disabled if a library it depends on has not been activated.

What's New in Premiere Pro CS5?

When an importer's settings dialog is opened, the importer now has access to the resolution, pixel aspect ratio, timebase, and audio sample rate of the source clip, in `imGetPrefsRec`.

Custom importers can now use a new call in the Importer File Manager Suite, `RefreshFileAsync`(), to be able to update a clip after it is modified in *imGetPrefs8*.

Two new selectors have been added. *imQueryDestinationPath* allows importers that trim or copy files to be able to change the destination path of the trimmed or copy file. *imQueryContentState* gives the host an alternate way of checking the state of a clip, for clips that have multiple source files. A new return value, `inFileNotAvailable` can be returned from *imQueryContentState* if the clip is no longer available because it is offline or has been deleted.

As a convenience, when a file is opened, an importer can tell Premiere Pro how much memory to reserve for the importer's usage, rather than calling `ReserveMemory` in the Memory Manager Suite. The importer should pass back this value in `imFileOpenRec8.outExtraMemoryUsage`.

Several new return values are available for more descriptive error reporting: `imBadHeader`, `imUnsupportedCompression`, `imFileOpenFailed`, `imFileHasNoImportableStreams`, `imFileReadFailed`, `imUnsupportedAudioFormat`, `imUnsupportedVideoBitDepth`, `imDecompressionError`, and `imInvalidPreferences`.

What's New in Premiere Pro CS4?

For CS4 only, importers are loaded and called from a separate process. As a result of being in a separate process, (1) all importers must do their own file handling, (2) `privateData` is no longer accessible from *imGetPrefs8*, and (3) the compressed frame selectors such as *imGetCompressedFrame* are no longer supported (this may now be achieved using custom pixel formats and a renderer plug-in).

To debug importers, attach to the ImporterProcessServer process. There is also a separate Importer Process Plugin Loading.log.

All legacy selectors have been removed, and are now longer supported. All structures used only in these legacy selectors have been removed as well.

There are built-in XMP metadata handlers for known filetypes. These handlers write and read metadata to and from the file, without going through the importer. *imSetTimeInfo8* is no longer called, since this is set by the XMP handler for that filetype.

All file-based importers (which does not include synthetics) are required to do their own file handling now, rather than having Premiere Pro open the files. The `imCallbackFuncs`: `OpenFileFunc` and `ReleaseFileFunc` are no longer supported.

Due to the out-of-process importing, `privateData` is not accessible during *imGetPrefs8*, and has been removed from `imGetPrefsRec`.

imGetFrameInfo, *imDisposeFrameInfo*, *imGetCompressedFrame*, and *imDisposeCompressedFrame* are no longer supported. Supporting a custom pixel format in an importer, a renderer, and an exporter is the new way to implement smart rendering, by passing custom compressed data from input to output.

New `imFrameNotFound` return code. Returned if an importer could not find the requested frame (typically used with async importers).

New in Premiere Pro 4.1, importer prefs are now part of `imSourceVideoRec`, passed to both *imGetSourceVideo* and the async import calls

New in Premiere Pro 4.1, there is a new `filepath` member in `imFileInfoRec8`. For clips that have audio in files separate from the video file, set the filename here, so that UMIDs can properly be generated for AAFs.

What's New in Premiere Pro CS3?

Importers can specify an initial poster frame for a clip in `imImageInfoRec`.

Importers can specify subtype names during the new *imGetSubTypeNames* selector. This selector is sent after each *imGetIndFormat*, which gives an importer the opportunity to enumerate all the fourCCs and display names (e.g. "Cinepak") of their known compression types for a specific filetype. The importer can return `imUnsupported`, or create an array of `imSubTypeDescriptionRec` records (pairs of fourCCs and codec name strings) for all the codecs/subtypes it knows about.

Importers that open their own files should specify how many files they keep open between *imOpenFile8* and *imQuietFile* using the new Importer File Manager Suite, if the number is not equal to one. Importers that don't open their own files, or importers that only open a single file should not use this suite. Premiere's File Manager now keeps track of the number of files held open by importers, and limits the number open at a time by closing the least recently used files when too many are open. On Windows, this helps memory usage, but on Mac OS this addresses a whole class of bugs that may occur when too many files are open.

Importers can also specify that certain files have very high memory usage, by setting imFileInfoRec8.highMemUsage. The number of files allowed to be open with this flag set to true is currently capped at 5.

Importers can now specify an arbitrary matte color for premultiplied alpha channels in imImageInfoRec.matteColor. Importers can state that they are uncertain about a clip's pixel aspect ratio, field type, or alpha info in imImageInfoRec.interpretationUncertain.

The imInvalidHandleValue is now -1 for Mac OS.

Importers can specify a transform matrix for frames by setting imImageInfoRec.canTransform = kPrTrue, and then during *imImportImage*, when imImportImageRec.applyTransform is non-zero, use imImportImageRec.transform, and destClipRect to calculate the transform - This code path is currently not called by Premiere Pro. After Effects uses this call to import Flash video.

New in Premiere Pro 3.1, the new capability flag, imImportInfoRec.canSupplyMetadataClipName, allows an importer to set the clip name from metadata, rather than the filename. The clip name should be set in imFileInfoRec8.streamName. This is useful for clips recorded by some new file-based cameras.

New in Premiere Pro 3.1, the new *imGetFileAttributes* selector allows an importer to provide the clip creation date in the new imFileAttributesRec.

Getting Started

The Basics of Import

For each clip, importers can tell Premiere the resolutions and pixel formats they can decode video frames to. Premiere will request video frames as needed during scrubbing, playback, or export. Audio will be requested right when the clip is imported, if audio conforming or peak file generation is necessary. If audio conforming is not necessary, audio frames will be requested as needed during scrubbing, playback, or export. Premiere requests audio in arrays of 32-bit float, uninterleaved format.

Try the Sample Importer Plug-ins

Choose which one of the three sample importers matches closest with your desired functionality. Build that one, or if you are still not sure, build all three! Step through the code in your debugger to learn order of events. Start your importer by modifying one of the SDK samples.

imGetSourceVideo versus imImportImage

For synchronous import, there are two different selectors an importer can use to provide frames to the host. Why? *imGetSourceVideo* is best for media that has specific resolutions. Importers that support *imGetSourceVideo* can import frames at their native resolution or specify preferred resolutions, rather than having to scale the frames to an arbitrary size. *imImportImage* is only useful for resolution-independent video, such as vector-based graphics. Choose the one that fits the media your importer will support. The SDK importer demonstrates *imGetSourceVideo* because resolution dependent video is much more common. The synthetic importer sample demonstrates *imImportImage* because it generates video on-the-fly and doesn't have a preference as to video resolution. `imImageInfoRec.supportsGetSourceVideo` should be set to true if the importer wants to support *imGetSourceVideo*.

Asynchronous Import

Importers can optionally support asynchronous calls to read frames for better performance. `imImageInfoRec.supportsAsyncIO` should be set to true if the importer wants to support asynchronous import. The importer can implement *imCreateAsyncImporter*, which tells the importer to create an asynchronous importer object using the data provided, and store it in `imAsyncImporterCreationRec`. This async importer object must implement a separate entry point from a standard importer because it does not follow the same rules as a standard importer.

All calls to `AsyncImporterEntry` are reentrant, except for the *aiClose* selector. *aiClose* will only be called once, but may be called while other calls are still executing. No calls will be made after *aiClose* is called.

Here is an overview of the lifetime of an async importer:

1.) The host calls *imOpenFile* and *imGetInfo* on the standard importer.
2.) The host calls *imCreateAsyncImporter* on the standard importer. At this time, the standard importer creates the private data for the async importer. The async importer MUST NOT contain a link to the standard importer, as their lifetimes are now decoupled. The async importer, therefore, must contain copies of all relevant private data from the creator importer. The importer preferences are also guaranteed to not change during the lifetime of the async importer.
3.) The host uses the async importer to perform i/o.
4.) The host closes the async importer, forgetting about it. This will happen

whenever the app loses focus, or when the async importer is no longer needed.

privateData

Don't use global variables to store data. Use `privateData` instead. Each clip can have its own `privateData`. The host application will automatically pass the correct `privateData` to the appropriate importer instance.

For `privateData`, create a handle to the custom structure you wish to store (during *imGetInfo8* or *imGetPrefs8*.) and save the handle to the `privateData` member of the structure passed in. The importer is responsible for allocating and deallocating the memory for `privateData` using Premiere's memory functions. Free the allocated `privateData` during *imCloseFile or imShutdown*, as appropriate.

Clip Source Settings

This data is unique to each clip instance, and can be used to store clip-wide data that affects the appearance of video and/or audio in the clip, usually user-modifiable. For example, Clip Source Settings for a titler/graphics importer could contain all the data describing the text and shapes for that clip. For a raw video clip, it could contain metadata that affects how the video is developed prior to import.

Starting in Premiere Pro CC 2014, importers can now choose the format they are rendering in, which allows importers to change pixel formats and quality based on criteria like enabled hardware and other Clip Source Settings, such as HDR. To handle the negotiation, implement *imSelectClipFrameDescriptor*.

Clip Source Settings can be shown on file creation (for synthetic or custom importers) or when a clip is double-clicked. Settings data should be stored in a disk-safe `prefs` structure, which is defined by the importer. Premiere will allocate the `prefs` based on the `prefsLength` returned from the first call to *imGetPrefs8*. Premiere will deallocate the `prefs` when it is no longer needed.

Once prefs has been allocated, the importer should show its setup dialog during all subsequent calls to *imGetPrefs8*, and store any setup dialog settings in `prefs`. Like `privateData`, each clip has its own prefs, and the host application automatically passes the correct `prefs` to the appropriate importer instance.

If the user changes the Clip Source Settings in a way such that the frames should be reimported, then the importer should use the Importer File Manager Suite to call `RefreshFileAsync`() on the main file. This is demonstrated in the SDK Custom Importer sample code.

Showing a Video Preview in the Settings Dialog

If a clip is placed in the timeline, and its settings dialog is opened by double-clicking in the timeline, then the import can get frames from the timeline of the settings dialog. Only the rendered frames on layers beneath the current clip or timeline location are available. Use the `getPreviewFrameEx` callback with the time given by `tdbTimelocation` in `imGetPrefsRec`. `timelineData` is also valid during *imGetPrefs8*.

File Handling

Basic importers that bring in media from a single file can rely on the host to provide basic file handling. If a clip has child files or a custom file system, an importer can provide its own file handling. Set `canOpen`, `canSave`, and `canDelete` to true during *imInit*, and respond to *imOpenFile8*, *imQuietFile*, *imCloseFile*, *imSaveFile8*, *imDeleteFile8*. Use the Async File Reader Suite for cross-platform file operations.

Quieting versus Closing a File

When the application loses focus, importers receive *imQuietFile* for each file it has been asked to open. Update any `PrivateData` and close the file. If the project is closed, *imCloseFile* is sent, telling the importer to free any `PrivateData`. If the importer didn't store any `PrivateData`, it will not receive *imCloseFile*.

Growing Files

Starting in CS6.0.2, an importer should set `imFileInfoRec8.mayBeGrowing` to true if it may grow after it has been imported. If an importer reports that a certain clip may be growing, Premiere Pro adds it to a list of files that are called back periodically, where the period is based on the user preference in the Media Preferences > Growing Files. The Growing File Manager then wakes up at the interval and refreshes the clip if the media state is different.

In CS6.0.0 and CS6.0.1, the importer should get the refresh rate using the new call `GetGrowingFileRefreshInterval()` in the Importer File Manager Suite. It should call `RefreshFileAsync()` to refresh the file.

Importing from Streaming Sources

For importing video from a streaming source, in order to pretend that the file is a local file or available on the network, create a placeholder file like `video_proxy.abc`.

Inside this file, include info that lets your importer know it is your own type, and the http path, like this:
```
"MyCompany ABC streaming format placeholder file
https://myurl.com/video.abc"
```

Your importer would open the local video_proxy.abc file, check the header and find it is your own placeholder file, and then access the real contents at the http location included. To create the local .abc files, you could use a custom importer that presents a OS dialog to choose the remote file, or a Premiere panel to do so. The Panel SDK can be found here:
https://github.com/Adobe-CEP/Samples/tree/master/PProPanel

If the filetype is an existing filetype supported by Premiere Pro, then set a high value in `imImportInfoRec.priority` to give your importer the first opportunity to handle the file.

For your filetype to be visible in the Proxy > Attach Proxies window, set `imIndFormatRec.flags |= xfIsMovie` (this flag is labeled obsolete, but still needed for this case)

If your importer supports different fractional resolutions and decode qualities, the fractional resolutions can be enumerated in response to the selector *imGetPreferredFrameSize*, and the decode quality hint is sent on import requests to your importer (for example in `imSourceVideoRec.inQuality`).

Audio Conforming and Peak File Generation

When a clip that contains audio is imported into Premiere, one or two types of files may be generated:

First, a separate .pek file is always created. This contains peak audio samples for quick access when Premiere needs to draw the audio waveform, for example in the Source Monitor or Timeline panel.

Second, the audio may be conformed into a separate .cfa file. The conformed audio is in an interleaved 32-bit floating point format that matches the sequence audio sample rate, to maximize the speed at which Premiere can render audio effects and mix it without sacrificing quality.

Both of these files can be generated through sequential calls for audio using *imImportAudio7*. Audio conforming cannot be disabled through the Premiere menus or API. However, if an importer can provide random-access, uncompressed audio of the clip, Premiere will not conform the audio. All compressed audio data must be conformed.

Specifically, it is important to set these flags to avoid conforming:
```
imImportInfoRec.avoidAudioConform = kPrTrue;
imFileInfoRec8.accessModes |= kRandomAccessImport;
```

Starting in CS5.5, peak audio data can also optionally be provided by the importer, if the importer implements a faster way to read the peak audio data from the clip. By setting imImportInfoRec. canProvidePeakAudio to non-zero, the importer will be sent *imGetPeakAudio* whenever this data is requested. Starting in CS6, if an importer wants to provide peak audio data on a clip-by-clip basis, it can set `imFileInfoRec8.canProvidePeakData` accordingly.

The location of the .cfa and .pek files is determined by the user-specified path in Edit > Preferences > Media > Media Cache Files. When the project is closed, the files will be cleaned up. If the source clip is not saved in the project, the associated conformed audio files will be deleted.

Importers can get audio for scrubbing, playing and other timeline operations before conforming has completed, resulting in responsive audio feedback during conforming. To do this, they must support both random access and sequential access audio importing. The `kSeparateSequentialAudio` access mode should be set in `imFileInfoRec8.accessModes`.

Quality Levels

Importers can optionally support two different quality modes, with the `imDraftMode` flag that is used in `imImportImageRec`.

Closed Captioning

Starting in CC, importers can support closed captioning that is embedded in the source media. The built-in QuickTime importer provides this capability. Note that Premiere Pro can also import and export captions in a sidecar file (e.g. .mcc, .scc, or .xml) alongside any media file, regardless of the media file format. This does not require any specific work on the importer side.

To support embedded closed captioning, set `imImportInfoRec.canSupportClosedCaptions` to true. The importer should handle the following selectors: *imInitiateAsyncClosedCaptionScan*, *imGetNextClosedCaption*, and *imCompleteAsyncClosedCaptionScan*.

imInitiateAsyncClosedCaptionScan will be called for every file that is imported through an importer that sets `canSupportClosedCaptions` to true. The plug-in should at this point determine whether or not there is closed captioning data for this file. If not, then the plug-in should simply return `imNoCaptions`, and everything is done. If the plug-in didn't report an error for that call, then *imGetNextClosedCaption* will be called until the plug-in returns `imNoCaptions`. After which, *imCompleteAsyncClosedCaptionScan* will be called informing the importer that the host is done requesting captions.

Both *imGetNextClosedCaption* and *imCompleteAsyncClosedCaptionScan* may be called from a different thread from which *imInitiateAsyncClosedCaptionScan* was originally called. To help facilitate this, `outAsyncCaptionScanPrivateData` during *imInitiateAsyncClosedCaptionScan* can be allocated by the importer to be used for the upcoming calls, which can be deallocated in *imCompleteAsyncClosedCaptionScan*.

N-Channel Audio

Starting in CC, for audio configurations beyond mono, stereo, and 5.1, an importer can specify a channel layout by implementing the new *imGetAudioChannelLayout* selector. Otherwise the channel layout will be assumed to be discrete. For support prior to CC, the importer needs to import them as multiple streams.

Multiple Streams

Importers can support multiple streams of audio and/or video. For most filetypes with a single video and a simple audio configuration (mono, stereo, or 5.1), only a single stream is necessary. Multiple streams can be useful for stereoscopic footage, layered file types (like Photoshop PSD files), or clips with complex audio configuration (such as 4 mono audio channels). The following describes the general case of multiple streams. For stereoscopic importers, please refer to the description further down.

An importer describes each stream one-by-one during iterative calls to *imGetInfo8*. In response to each call, the importer describes one stream, and returns `imIterateStreams`, until it reaches the last stream, and then it returns `imBadStreamIndex`. Set `imFileInfoRec8->streamsAsComp = kPrFalse`, so that the set of streams appear as a single clip within Premiere Pro.

In *imGetInfo8*, save `streamIdx` in `privateData`, to have access to it later. That way, when called in *imImportAudio7*, the importer will know which stream of audio to pass back.

See the sample code in the SDK File Importer, which can be turned on by uncommenting back in the `MULTISTREAM_AUDIO_TESTING` define in SDK_File_Import.h.

Stereoscopic Video

First, an importer must advertise multiple video streams. During *imGetInfo8*, the host passes in the stream index in `imFileInfoRec8.streamIdx`. If the clip has a second stream, then on index 0 the importer should return `imIterateStreams` and it will be called again for the second stream. On the second one you return `imNoErr`, as before. The nice thing is that this works in Premiere Pro CS5.5 and earlier - when two video streams are present, on import, they will just appear as two different project items.

Prior to CS6, an importer would need to have a prefs structure and on *imGetInfo8* it would need to store the stream index in that structure. With CS6 this is a lot simpler. Now, in the `imSourceVideoRec` (passed in *imGetSourceVideo*, and part of the *aiFrameRequest* for async importers), the host application passes in the `currentStreamIndex` (in the value formerly known as `unused1`). This makes it much easier to just check when providing a `PPix` and differentiate the two streams.

Now, obviously, it is not desirable to have two project items. In order to get them merged, an importer needs to label the streams (the logic here is pretty simple, if there are multiple labeled video streams, it will appear as a single project item, and all views on that item will show the first stream). For this there is a new selector: *imQueryStreamLabel*. The struct passed to the importer has its privateData, prefs data, and the stream index, and the label needs to be passed back in a `PrSDKString`. If you're not familiar with `PrSDKStringSuite`, it's fairly obvious how to use. In this case you'll be allocating a string, passing either UTF-8 data, or UTF-16 data.

In PrSDKStreamLabel.h we define two labels: `kPrSDK_StreamLabelStereoscopic_Left` and `kPrSDKStreamLabel_Stereoscopic_Right`. By convention, we expect Left to be stream 0 and Right to be stream 1. This is purely for consistency - if we have multiple stereo clips from multiple importers, we would want the thumbnails to all be consistent. If we stick to this convention, then the thumbnails will all be Left.

To integrate well with other third-parties, we strongly encourage using these labels for stereoscopic importers. However, the entire StreamLabel mechanism is intentionally left quite general. You could use whatever labels you want in your importers and effects, and when you request the video segments you can pass whatever label you would like. If you have other uses for this, we would be interested to hear about them, and we would welcome any bug reports.

Project Manager Support

The Project Manager in Premiere Pro allows users to archive projects, trim out unused media, or collect all source files to a single location. Importers are the most knowledgable about the sources they work with. So Premiere Pro doesn't make any assumptions about the source media, but instead relies on the importers to handle the trimming and file size estimates. Only importers that specifically support trimming will trim and not copy when the Project Manager trims projects.

To support trimming, importers will want to set the `canCalcSizes` and `canTrim` flags during *imInit*, and support *imCalcSize8*, *imCheckTrim8*, and *imTrimFile8*.

If the each clip has more than one source file (such as audio channels in separate files), the importer should also set `canCopy` and support *imCopyFile*. Otherwise, the Project Manager will not know about the other source files.

External files, such as textures, logos, etc. that are used by an importer instance but do not appear as footage in Project panel, should be registered with Premiere Pro using the File Registration Suite during *imGetInfo8* or *imGetPrefs8*. Registered files will be taken into account when trimming or copying a project using the Project Manager.

Creating a Custom Importer

This variant of the importer API allows importers to dynamically create disk-based media while working within Premiere. A titler plug-in or similar should use this API. Once your clip is created, it is treated like any other standard file and will receive all standard missing file handling.

A Custom Importer ***must*** do the following:

- Set the following flags true in `imImportInfoRec`; `canCreate`, `canOpen`, `addToMenu`, `noFile`. This tells Premiere your plug-in will create a clip on disk at *imGetPrefs8* time.

- To determine when you need to create a new clip vs. modify an existing clip, check the `imFileAccessRec` filename. If it's identical to the plug-in display name (as set in the PiPL), create a new clip; otherwise modify the clip.

- If the user cancels from your dialog when creating a new clip, return `imCancel`.

- If the clip is modified, the importer needs to do a few things for Premiere to pick up the changes. Put your file access information in the supplied `imFileAccessRec`. Premiere will use this data to reference your clip from now on. Close the file handle after you create it. Return `imSetFile` after creating a file handle in *imGetPrefs8*., and call `RefreshFileAsync`() in the Importer File Manager Suite to notify Premiere that the clip has been modified. Premiere will immediately call you to open the file and return a valid `imFileRef`. Respond to *imOpenFile8*, *imQuietFile*, *imCloseFile* at a minimum.

Real-Time Rolling and Crawling Titles

For RT rolls and crawls, a player and importer must be specially designed to work together. An importer can implement the appropriate functionality, but it is up to the player to take advantage of it.

Importers can make image data available for rolling and crawling titles, using `imImageInfoRec.isRollCrawl`. If the importer sets it to non-zero, this declares that the image is a title or other image that does roll/crawl, and that the importer supports the *imGetRollCrawlInfo* and *imRollCrawlRenderPage* selectors. *imGetRollCrawlInfo* is used to get info on the roll/crawl from the importer, and *imRollCrawlRenderPage* is used to get a rendered page of the roll/crawl.

Troubleshooting

How to Get First Crack at a File

To get the first opportunity to import a filetype also supported by a built-in importer (e.g. MPEG, AVI, QuickTime, etc), provide a different `subtype and classID` in order for your importer to be called for the types of files you support. `imImportInfoRec.priority` must be higher than any of the other importers for that filetype. Set this value to 100 or higher to override all built-in importers. Premiere Pro has more than one type of AVI importer and MPEG importer, which use this same prioritization mechanism. So your importer can override all of them and get the first shot at a filetype.

Just because you want to take over handling some files of a given filetype, it doesn't mean you have to handle all of them. To defer an unsupported `subtype` to a lower priority importer, return `imBadFile` during *imOpenFile8* or *imGetInfo8*. See the Media Abstraction chapter for more information on `filetypes`, `subtypes`, and `classIDs`.

Format repeated in menu?

To avoid having your importer appear multiple times in the file formats supported pop-up list, fill out the `formatName`, `formatShortName` and platform extension once and only once during your *imGetIndFormat*.

Resources

Importers must contain a IMPT resource. Premiere uses this to identify the plug-in as an im-porter. Also, depending on the type of importer (standard, synthetic, or custom), a PiPL may be required.

Entry Point

```
csSDK_int32 xImportEntry (
     csSDK_int32    selector,
     imStdParms     *stdParms,
     void           *param1,
     void           *param2)
```

selector is the action Premiere wants the importer to perform. `stdParms` provides callbacks to obtain additional information from Premiere or to have Premiere perform tasks. `param1` and `param2` vary with the selector; they may contain a specific value or a pointer to a structure. Return `imNoErr` if successful, or an appropriate return code.

Standard Parameters

A pointer to this structure is sent from the host application to the plug-in with every selector.

```
typedef struct {
     csSDK_int32          imInterfaceVer;
     imCallbackFuncs      *funcs;
     piSuitesPtr          piSuites;
} imStdParms;
```

Member	Description
`imInterfaceVer`	Importer API version Premiere Pro CC 2014 - `IMPORTMOD_VERSION_15` Premiere Pro CC - `IMPORTMOD_VERSION_14` Premiere Pro CS6.0.2 - `IMPORTMOD_VERSION_13` Premiere Pro CS6 - `IMPORTMOD_VERSION_12` Premiere Pro CS5.5 - `IMPORTMOD_VERSION_11` Premiere Pro CS5 - `IMPORTMOD_VERSION_10` Premiere Pro CS4 - `IMPORTMOD_VERSION_9`
`funcs`	Pointers to callbacks for importers
`piSuites`	Pointer to universal callback suites

Importer-Specific Callbacks

```
typedef struct {
     ClassDataFuncsPtr   classFuncs;
     csSDK_int32         unused1;
     csSDK_int32         unused2;
} imCallbackFuncs;

typedef csSDK_int32 (*importProgressFunc){
     csSDK_int32     partDone;
     csSDK_int32     totalToDo;
     void            *trimCallbackID};
```

Function	Description
`classFuncs`	See ClassData functions.

`importProgressFunc`	Available in `imSaveFileRec` and `imTrimFileRec` during *imSaveFile8* and *imTrimFile8*. Callback function pointer for use during project archiving or trimming to call into Premiere and update the progress bar and check for cancellation. Either `imProgressAbort` or `imProgressContinue` will be returned. The `trimCallbackID` parameter is passed in the same structures.

Selector Table

Before implementing a handler for a certain selector, make sure that it is really necessary for your importer. Many selectors are optional, and only useful for certain special needs.

The Synth column indicates whether or not the selector is applicable to synthetic importers. Custom importers can respond to any of the selectors.

Selector	param1	param2	Synth
imInit	`imImportInfoRec` *	unused	Yes
imShutdown	unused	unused	Yes
imGetIndFormat	`(int) index`	`imIndFormatRec` *	Yes
imGetSupports8	unused	unused	Yes
imGetSupports7	unused	unused	Yes
imGetInfo8	`imFileAccessRec8` *	`imFileInfoRec8` *	Yes
imCloseFile	`imFileRef` *	`(void*) PrivateData` **	No
imGetIndPixelFormat	`(int) index`	`imIndPixelFormatRec` *	Yes
imGetPreferredFrameSize	`imPreferredFrameSizeRec` *	unused	Yes
imSelectClipFrameDescriptor	`imFileRef`	`imClipFrameDescriptorRec` *	Yes
imGetSourceVideo	`imFileRef`	`imSourceVideoRec` *	Yes
imCreateAsyncImporter	`imAsyncImporterCreationRec` *	unused	Yes
imImportImage	`imFileRef`	`imImportImageRec` *	Yes
imImportAudio7	`imFileRef`	`imImportAudioRec7` *	Yes
imResetSequentialAudio	`imFileRef`	`imImportAudioRec7` *	Yes

imGetSequentialAudio	`imFileRef`	`imImportAudio-Rec7` *	Yes
imGetPrefs8	`imFileAccessRec8` *	`imGetPrefsRec` *	Yes
The following selectors are optional, to provide custom file handling			
imOpenFile8	`imFileRef` *	`imFileOpenRec8` *	No
imQuietFile	`imFileRef` *	`(void*) PrivateData` **	No
imSaveFile8	`imSaveFileRec8` *	unused	No
imDeleteFile	`imDeleteFileRec` *	unused	No
The following selectors are optional, for better support copying and trimming files using the Project Manager			
imCalcSize8	`imCalcSizeRec` *	`imFileAccessRec8` *	No
imCheckTrim8	`imCheckTrimRec` *	`imFileAccessRec8` *	No
imTrimFile8	`imFileAccessRec8` *	`imTrimFileRec8` *	No
imCopyFile	`imCopyFileRec` *	unused	No
imRetargetAccelerator	`imAcceleratorRec` *	unused	No
imQueryDestinationPath	`imQueryDestination-PathRec` *	unused	No
The following selectors are used for embedded Closed Captioning support.			
imInitiateAsyncClosed-CaptionScan	`imFileRef`	`imInitiateAsync-ClosedCaption-ScanRec` *	No
imGetNextClosedCaption	`imFileRef`	`imGetNextClosed-CaptionRec` *	No
imCompleteAsyncClosed-CaptionScan	`imFileRef`	`imCompleteAsync-ClosedCaption-ScanRec` *	No
The following selectors are optional, useful for a subset of importers			
imAnalysis	`imFileRef`	`imAnalysisRec` *	Yes
imDataRateAnalysis	`imFileRef`	`imDataRate-AnalysisRec` *	No
imGetTimeInfo8	`imFileRef`	`imTimeInfoRec8` *	No
imSetTimeInfo8	`imFileRef`	`imTimeInfoRec8` *	No
imGetFileAttributes	`imFileAttributesRec` *	unused	
imGetMetaData	`imFileRef`	`imMetaDataRec` *	No
imSetMetaData	`imFileRef`	`imMetaDataRec` *	No
imGetRollCrawlInfo	`imRollCrawl-InfoRec` *	unused	Yes
imRollCrawlRenderPage	`rollCrawlRender-Rec` *	unused	Yes

imDeferredProcessing	imDeferred-ProcessingRec *	unused	No
imGetAudioChannelLay-out	imFileRef	imGetAudioChan-nelLayoutRec *	Yes
imGetPeakAudio	imFileRef	imPeakAudioRec *	Yes
imQueryContentState	imQueryContent-StateRec *	unused	No
imQueryStreamLabel	imQueryStreamLabel-Rec *	unused	Yes
imGetIndColorSpace	ColorProfileRec	unused	Yes
Used only in After Effects			
imGetSubTypeNames	(csSDK_int32) fi-leType	imSubTypeDescrip-tionRec **	No
imGetIndColorProfile	(int) index	imIndColorPro-fileRec *	No
imQueryInputFileList	imQueryInputFileL-istRec *	unused	No

Selector Descriptions

This section provides a brief overview of each selector and highlights implementation issues. Additional implementation details are at the end of the chapter.

imInit

```
param1 - imImportInfoRec*
param2 - unused
```

Sent during application startup. Describe the importer's capabilities in the `imImportInfoRec`; all options are false by default. The similarly named flags in imIndFormatRec.flags are obsolete and should not be used.

Set `hasSetup` to `kPrTrue` if the importer has a setup dialog, and `setupOnDblClk` to `kPrTrue` to have that dialog display when the user double-clicks a file in the Project Panel; Premiere throws away any preview files generated for a file imported with this setting, even if no setup dialog is displayed.

Return `imIsCacheable` from *imInit* if a plug-in does not need to be called to initialize every time Premiere launched. This will help reduce the time to launch the application.

Synthetic Importers

Setting `noFile` to `kPrTrue` indicates that the importer is synthetic. Set `addToMenu` to `kPrTrue` to add the importer to the File > New menu.

Custom Importers

To create a custom importer, the following capabilities must be set. See Additional Details for more info on custom importers.

```
noFile = kPrTrue;
hasSetup = kPrTrue;
canOpen = kPrTrue;
canCreate = kPrTrue;
addToMenu = imMenuNew;
```

imShutdown

```
param1 - unused
param2 - unused
```

Release all resources and perform any other necessary clean-up; sent when Premiere quits.

imGetIndFormat

```
param1 -(int)index
param2 - imIndFormatRec *
```

Sent repeatedly, immediately after imInit; enumerate the filetypes the plug-in supports by populating the imIndFormatRec. When finished, return imBadFormatIndex. imIndFormatRec.flags are obsolete and should not be used.

Synthetic Importers
Because they have no file, synthetic importers only need to respond with the filetype established in their resource. Create a separate plug-in for each synthetic file type.

imGetSupports8

```
param1 - unused
param2 - unused
```

A plug-in that supports the Premiere Pro 2.0 API (and beyond) must return `malSupports8`.

imGetSupports7

```
param1 - unused
param2 - unused
```

A plug-in that supports the Premiere Pro 1.0 API (and beyond) must return `malSupports7`.

imGetInfo8

```
param1 - imFileAccessRec8 *
param2 - imFileInfoRec8 *
```

Describe a clip, or a single stream of a clip if the clip has multiple streams. Called when a specific file is instantiated. Importer checks file validity, optionally allocates file instance data, and describes the properties of the file being imported by populating the `imFileInfoRec8`.

Synthetic Importers
You can create a still frame, a movie of a set duration, or an 'infinite' length movie, but cannot change the properties of a synthetic file once imported.

imCloseFile

```
param1 - imFileRef *
param2 - (void*) PrivateData **
```

The specified file is no longer required; dispose of `privateData`. Only sent if `privateData` was allocated during *imGetInfo8*.

imGetIndPixelFormat

```
param1 -(int) index
param2 - imIndPixelFormatRec *
```

New optional selector called to enumerate the pixel formats available for a specific file. This message will be sent repeatedly until all formats have been returned. Pixel formats should be returned in the preferred order that the importer supports. The Importer should return imBadFormatIndex after all formats have been enumerated. imUnsupported should be returned on the first call if only *yawn* `BGRA_4444_8u` is supported.

What pixel formats should you support? Keep it real. Just return the pixel format that most closely matches the data stored in your file. If decoding to two or more formats can be done at about the same speed, declare support for both, but favor any pixel formats that are more compact, to save on memory and bandwidth.

imGetPreferredFrameSize

```
param1 - imFileRef
param2 - imPreferredFrameSizeRec *
```

Provide the frame sizes preferred by the importer.

imSelectClipFrameDescriptor

```
param1 - imFileRef
param2 - imClipFrameDescriptorRec *
```

New in Premiere Pro CC 2014. If the importer can provide multiple formats, describe the format it will provide here. This allows importers to change pixel formats based on criteria like enabled hardware and other source settings, such as HDR.

imGetSourceVideo

```
param1 - imFileRef
param2 - imSourceVideoRec *
```

Get the host an unscaled frame of video. This selector will be sent instead of *imImportImage* if `supportsGetSourceVideo` is set to true during *imGetInfo8*.

imCreateAsyncImporter

`param1` - `imAsyncImporterCreationRec *`
`param2` - unused

Create an asynchronous importer object using the data provided, and store it in `imAsyncIm-porterCreationRec`.

imImportImage

```
param1 - imFileRef
param2 - imImportImageRec *
```

Note: In most cases, *imGetSourceVideo* is the better choice. Before going down this route, read the discussion here. Give the host a frame of video; populate the `imImportImageRec` buffer with pixel data, or (if you've set `canDraw` to true during *imInit*) draw to the screen in the provided window using platform-specific calls to do so. You must scale the image data to fit the window; Premiere relies on the import module for properly scaled frames.

imImportAudio7

```
param1 - imFileRef
param2 - imImportAudioRec7 *
```

Replacement for imImportAudio that uses new imAudioInfoRec7. Called to import audio using the new 32-bit float, uninterleaved audio format. Fill `imImportAudioRec7->buffer` with the number of sample frames specified in `imImportAudioRec7->size`, starting from `imImportAudioRec7->position`. Always return 32-bit float, uninterleaved samples as described in the Universals chapter. You may use the calls in the Audio Suite to do some common conversions.

imGetPrefs8

```
param1 - imFileAccessRec8 *
param2 - imGetPrefsRec *
```

Only sent if clip filetype uses a setup dialog within Premiere. Premiere sends this selector when the user imports (or creates, if synthetic) a file of your type, or when double-clicking on an existing clip. You must have set `hasSetup = true` during *imInit* to receive this selector.

Storing preferences is a two step process. If the pointer in `imGetPrefsRec.prefs` is NULL, set `prefsLength` to the size of your preferences structure and return `imNoErr`. Premiere sends *imGetPrefs* again; display your dialog, and pass the preferences pointer back in `imGetPrefsRec.prefs`. Starting in Premiere Pro 1.5, the importer can get a frame from the timeline beneath the current clip or timeline location. This is useful for titler plug-ins. Use the getPreviewFrameEx callback with the time given by TDB_TimeRecord tdbTimelocation in imGetPrefsRec.

Synthetic Importers
Synthetic importers can specify the displayable name by changing the `newfilename` member of `imFileAccessRec8`.

The first time this selector is sent, the `imGetPrefsRec.timelineData`, though non-null, contains garbage and should not be used. It will only contain valid information once the user has put the clip into the timeline, and is double-clicking on it.

Custom Importers
Custom importers should return `imSetFile` after successfully creating a new file, storing the file access information in `imFileAccessRec8`. Premiere will use this data to then ask the importer to open the file it created. See Additional Details for more information on custom importers.

imOpenFile8

```
param1 - imFileRef *
param2 - imFileOpenRec8 *
```

Open a file and give Premiere its handle. This selector is sent only if `canOpen` was set to true during *imInit*; do so if you generate child files, you need to have read and write access during the Premiere session, or use a custom file system. If you respond to this selector, you must also respond to *imQuietFile* and *imCloseFile*. You may additionally need to respond to *imDeleteFile* and *imSaveFile*; see Additional Details. Close any child files during *imCloseFile*.

Importers that open their own files should specify how many files they keep open between *imOpenFile8* and *imQuietFile* using the new Importer File Manager Suite, if the number is not equal to one. Importers that don't open their own files, or importers that only open a single file should not use this suite. Premiere's File Manager now keeps track of the number of files held open by importers, and limits the number open at a time by closing the least recently used files when too many are open. On Windows, this helps memory usage, but on Mac OS this addresses a whole class of bugs that may occur when too many files are open.

imQuietFile

```
param1 - imFileRef *
param2 - (void*) PrivateData **
```

Close the file in `imFileRef`, and release any hardware resources associated with it. Respond to this selector only if *canOpen* was set to true during imInit. A quieted file is closed (at the OS level), but associated `privateData` is maintained by Premiere. Do not deallocate `privateData` in response to *imQuietFile*; do so during *imCloseFile*.

imSaveFile8

```
param1 - imSaveFileRec8 *
param2 - unused
```

Save the file specified in `imSaveFileRec8`. Only sent if `canOpen` was set to true during *im-Init*.

imDeleteFile

```
param1 - imDeleteFileRec *
param2 - unused
```

Request this selector (by setting `canDelete` to true during *imInit*) only if you have child files or related files associated with your file. If you have only a single file per clip you do not need to delete your own files. Numbered still file importers do not need to respond to this selector; each file is handled individually.

imCalcSize8

```
param1 - imCalcSizeRec *
param2 - imFileAccessRec8 *
```

Called before Premiere trims a clip, to get the disk size used by a clip. This selector is called if the importer sets `imImportInfoRec.canCalcSizes` to non-zero. An importer should support this call if it uses a tree of files represented as one top-level file to Premiere. The importer should calculate either the trimmed or current size of the file and return it. If the trimIn and duration are set to zero, Premiere is asking for the current size of the file. If the trimIn and duration are valid values, Premiere is asking for the trimmed size.

imCheckTrim8

```
param1 - imCheckTrimRec *
param2 - imFileAccessRec8 *
```

Called before Premiere trims a clip, to check if a clip can be trimmed at the specified boundaries. imCheckTrimRec and imFileAccessRec are passed in. The importer examines the proposed trimmed size of the file, and can change the requested in point and duration to new values if the file can only be trimmed at certain locations (for example, at GOP boundaries in MPEG files). If the importer changes the in and duration, the new values must include all the material requested in the original trim request. If an importer does not need to change the in and duration, it may either return imUnsupported, or imNoErr and simply not change the in/duration fields. If the importer does not want the file trimmed (perhaps because the audio or video would be degraded if trimmed at all) it can return imCantTrim and the trim operation will fail and the file will be copied instead.

For a file with both audio and video, the selector will be sent several times. The first time, `im-CheckTrimRec` will have both `keepAudio` and `keepVideo` set to a non-zero value, and the trim boundaries will represent the entire file, and Premiere is asking if the file can be trimmed at all. If the importer returns an error, it will not be called again. The second time, imCheckTrimRec will have keepAudio set to a non-zero value, and the trim boundaries will represent the audio in and out points in the audio timebase, and Premiere is asking if the audio can be trimmed on these boundaries. The third time, imCheckTrimRec will have keepVideo set to a non-zero value, and the trim boundaries will represent the video in and out points in the video timebase, and Premiere is asking if the video can be trimmed on these boundaries. If either the video or audio boundaries extend further than the other boundaries, Premiere will trim the file at the furthest boundary.

imTrimFile8

```
param1 - imFileAccessRec8 *
param2 - imTrimFileRec8 *
```

Called when Premiere trims a clip. imFileAccessRec8 and imTrimFileRec8 are passed in. imDiskFull or imDiskErr may be returned if there is an error while trimming. The current file, inPoint, and new duration are given and a destination file path. If a file has video and audio, the trim time is in the video's timebase. For audio only, the trim times are in the audio timebase. A simple callback and callbackID is passed to imTrimFile8 and imSaveFile8 that allows plug-ins to query whether or not the user has cancelled the operation. If non-zero (and they can be nil), the callback pointer should be called to check for cancellation. The callback function will return imProgressAbort or imProgressContinue.

imCopyFile

```
param1 - imCopyFileRec *
param2 - unused
```

imCopyFile is sent rather than *imSaveFile* to importers that have set imImportInfoRec.canCopy when doing a copy operation using the Project Manager. The importer should maintain data on the original file rather than the copy when it returns from the selector.

imRetargetAccelerator

```
param1 - imAcceleratorRec *
param2 - unused
```

When the Project Manager copies media and its accelerator, this selector gives an opportunity to update the accelerator to refer to the copied media.

imQueryDestinationPath

param1 - `imQueryDestinationPathRec` *
param2 - unused

New in CS5. This allows the plug-in to modify the path that will be used for a trimmed clip, so the trimmed project is written with the correct path.

imInitiateAsyncClosedCaptionScan

```
param1 - imFileRef
param2 - imInitiateAsyncClosedCaptionScanRec *
```

New in CC. Gives a chance for the importer to allocate private data to be used during the scan for any closed captions embedded in the clip. If there are no captions, return `imNoCaptions`.

imGetNextClosedCaption

```
param1 - imFileRef
param2 - imGetNextClosedCaptionRec *
```

New in CC. Called iteratively, each time asking the importer for a single closed caption embedded in the clip. After returning the last caption, return `imNoCaptions` to signal the end of the scan.

imCompleteAsyncClosedCaptionScan

```
param1 - imFileRef
param2 - imCompleteAsyncClosedCaptionScanRec *
```

New in CC. Called to cleanup any temporary data used while getting closed captions embedded in the clip, and to see if the scan completed without error.

imAnalysis

```
param1 - imFileRef
param2 - imAnalysisRec *
```

Provide information about the file in the `imAnalysisRec`; this is sent when the user views the Properties dialog for your file. Premiere displays a dialog with information about the file, including the text you provide.

imDataRateAnalysis

```
param1 - imFileRef
param2 - imDataRateAnalysisRec *
```

Give Premiere a data rate analysis of the file. Sent when the user presses the Data Rate button in the Properties dialog, and is enabled only if `hasDataRate` was true in the `imFileInfoRec` returned during *imGetInfo*. Premiere generates a data rate analysis graph from the data provided.

imGetTimeInfo8

```
param1 - imFileRef
param2 - imTimeInfoRec8 *
```

Read any embedded timecode data in the file. Supercedes *imGetTimeInfo*.

imSetTimeInfo8

```
param1 - imFileRef
param2 - imTimeInfoRec8 *
```

Sent after a capture completes, where timecode was provided by the recorder or device controller. Use this to write timecode data and timecode rate to your file. See the Universals chapter for more information on time in Premiere. Supercedes *imSetTimeInfo*.

Timecode rate is important for files that have timecode, but not an implicit frame rate, or where the sampling rate might differ from the timecode rate. For example, audio captured from a tape uses the video's frame rate for timecode, although its sampling rate is not equal to the timecode rate. Another example is capturing a still from tape, which could be stamped with timecode, yet not have a media frame rate.

imGetFileAttributes

```
param1 - imFileAttributesRec *
```

Optional. Pass back the creation date stamp in `imFileAttributesRec`.

imGetMetaData

```
param1 - imFileRef
param2 - imMetaDataRec *
```

Called to get a metadata chunk specified by a `fourcc` code. If `imMetaDataRec->buffer` is null, the plug-in should set `buffersize` to the required buffer size and return `imNoErr`. Premiere will then call again with the appropriate buffer already allocated.

imSetMetaData

```
param1 - imFileRef
param2 - imMetaDataRec *
```

Called to add a metadata chunk specified by a fourcc code.

imDeferredProcessing

`param1` - `imDeferredProcessingRec *`
`param2` - unused

Describe the current progress of the deferred processing on the clip.

imGetAudioChannelLayout

```
param1 - imFileRef
param2 - imGetAudioChannelLayoutRec *
```

New in CC. Called to get the audio channel layout in the file.

imGetPeakAudio

```
param1 - imFileRef
param2 - imPeakAudioRec *
```

Optional selector allows Premiere to get audio peak data directly from the importer. This is used for synthetic clips longer than five minutes. Providing peak data can significantly improve waveform rendering performance when the user views audio waveform of the clip in the Source Monitor.

imQueryContentState

param1 - `imQueryContentStateRec *`
param2 - unused

New in CS5. This is used by streaming importers and folder based importers (P2, XDCAM, etc) that have multiple files that comprise the content. If an importer doesn't support the selector then the host checks the last modification time for the main file.

imQueryStreamLabel

param1 - `imQueryStreamLabelRec` *
param2 - unused

New in CS6. This is used by stereoscopic importers to specify which stream IDs represent the left and right eyes.

imGetSubTypeNames

`param1 -(csSDK_int32)fileType`
`param2 - imSubTypeDescriptionRec **`

New optional selector added for After Effects CS3. As of CS4, this info still isn't used in Premiere Pro, but is used in After Effects to display the codec name in the Project Panel. The importer should fill in the codec name for the specific subtype fourcc provided. This selector will be sent repeatedly until names for all subtypes have been requested. The `imSubTypeDescription-Rec` must be allocated by the importer, and will be released by the plug-in host.

imGetIndColorProfile

param1 - `(int) index`
param2 - `imIndColorProfileRec` *

New in After Effects CS5.5; not used in Premiere Pro. Only sent if the importer has set `imIm-ageInfoRec.colorProfileSupport` to `imColorProfileSupport_Fixed`. This selector is sent iteratively for the importer to provide a description of each color profile supported by the clip. After all color profiles have been described, return a non-zero value.

imQueryInputFileList

`param1` - `imQueryInputFileListRec *`
`param2` - unused

New for After Effects CS6; not used in Premiere Pro. If an importer supports media that uses more than a single file (i.e. a file structure with seperate files for metadata, or separate video and audio files), this is the way the importer can specify all of its source files, in order to support Collect Files in After Effects. In `imImportInfoRec`, a new member, `canProvideFileL-`

`ist`, specifies whether the importer can provide a list of all files for a copy operation. If the importer does not implement this selector, the host will assume the media just uses a single file at the original imported media path.

Return Codes

Return Code	Reason
`imNoErr`	Operation has completed without error.
`imTooWide`	File dimensions too large.
`imBadFile`	Bad file format. To defer an unsupported `subtype` to a lower priority importer, return this during *imOpenFile8* or *imGetInfo8*.
`imUnsupported`	Unsupported selector.
`imMemErr`	Memory error.
`imOtherErr`	Unknown error.
`imNoContent`	No audio or video.
`imBadRate`	Bad audio rate.
`imBadCompression`	Bad compression.
`imBadCodec`	Codec not found.
`imNotFlat`	Unflattened QuickTime movie.
`imBadSndComp`	Bad sound compression.
`imNoTimecode`	Timecode supported, but not found.
`imMissingComponent`	Missing component needed to open the file.
`imSaveErr`	Error saving file.
`imDeleteErr`	Error deleting file.
`imNotFoundErr`	The requested metadata chunk was not found.
`imSetFile`	Return this from *imGetPrefs8* only if you are a custom importer and you need Premiere to alter it's file access information (e.g. a new path or filename is created).
`imIterateStreams`	Return from *imGetInfo8* to indicate that there are more streams to describe. Premiere will send *imGetInfo8* for the next stream.
`imBadStreamIndex`	Return from *imGetInfo8* after interating through streams to indicate that there are no more streams to describe.
`imCantTrim`	Return from *imCheckTrim* if the file cannot be trimmed by the importer.
`imDiskFull`	Return from *imTrimFile8* if there is not enough space to complete the trim operation.
`imDiskErr`	Return from *imTrimFile8* if there is a general disk or I/O error during the trim operation.

`imFileShareViolation`	Return from *imOpenFile8* if file cannot be opened due to another process having exclusive read access
`imIterateFrameSizes`	Return from *imGetPreferredFrameSize*, to be called again to describe more frame sizes for a particular pixel format.
`imMediaPending`	Return from *imGetSourceVideo* or *imCreateAsyncImporter* if the importer is still processing the file and cannot return video frames yet.
`imDRMControlled`	Return from *imOpenFile8* if the file cannot be opened because it is under rights management.
`imActivationFailed`	Activation of a component failed (usually due to user cancellation). This is used by Premiere Elements.
`imFrameNotFound`	New in CS4. Return if an importer could not find the requested frame (typically used with async importers)
`imBadHeader`	New in CS5. The file cannot be opened because of a header error
`imUnsupportedCompression`	New in CS5. The file has a compression type that the importer does not support
`imFileOpenFailed`	New in CS5. The importer was unable to open the file on disk
`imFileHasNoImportableStreams`	New in CS5. The file has no audio or video stream
`imFileReadFailed`	New in CS5. A read from an open file failed
`imUnsupportedAudioFormat`	New in CS5. The importer cannot import something in the audio format
`imUnsupportedVideoBitDepth`	New in CS5. The video bit depth of this file is unsupported by the importer
`imDecompressionError`	New in CS5. The importer hit an error decompressing the audio or video
`imInvalidPreferences`	New in CS5. Invalid prefs data was passed to the importer
`inFileNotAvailable`	New in CS5. Return from *imQueryContentState* if the file/stream is no longer available because it is offline or deleted
`imRequiresProtectedContent`	New in CS5.5. Return from *imInit* if the importer depends on a library that has not been activated yet.
`imNoCaptions`	New in CC. Return from *imInitiateAsyncClosedCaptionScan* if the clip has no closed captions, or return from *imGetNextClosedCaption* when there are no more captions.
`imCancel`	Return from *imGetPrefs8* if user cancels or the plug-in cannot open the file (custom/synthetic importer).
`imBadFormatIndex`	Return this when given an out of range format index, and from *imGetIndFormat* when plug-in has no more formats to enumerate.

`imIsCacheable`	Return from *imInit* if a plug-in does not need to be called to initialize every time Premiere is launched. This will help reduce the time to launch the application.

Structures

Structure	Sent with selector
`imAcceleratorRec`	*imRetargetAccelerator*
`imAnalysisRec`	*imAnalysis*
`imAsyncImporterCreationRec`	*imCreateAsyncImporter*
`imAudioInfoRec7`	*imGetInfo8* (member of `imFileInfoRec7`)
`imCalcSizeRec`	*imCalcSize8*
`imCheckTrimRec`	*imCheckTrim8*
`imClipFrameDescriptorRec`	*imSelectClipFrameDescriptor*
`imCompleteAsyncClosedCaptionScanRec`	*imCompleteAsyncClosedCaptionScan*
`imIndColorProfileRec`	*imGetIndColorProfile*
`imCopyFileRec`	*imCopyFile*
`imDataRateAnalysisRec`	*imDataRateAnalysis*
`imDeferredProcessingRec`	*imDeferredProcessing*
`imDeleteFileRec`	*imDeleteFile*
`imFileAccessRec8`	*imGetInfo8* and *imGetPrefs8*
`imFileAttributesRec`	*imGetFileAttributes*
`imFileInfoRec8`	*imGetInfo8*
`imFileOpenRec8`	*imOpenFile8*
`imFileRef`	*imAnalysis*, *imDataRateAnalysis*, *imOpenFile8*, *imQuietFile*, *imCloseFile*, *imGetTimeInfo8*, *imSetTimeInfo8*, *imImportImage*, *imImportAudio7*
`imFileSpec`	*imGetInfo8*, *imGetPrefs8*, *imSaveFile8*, *imDeleteFile*, and *imTrimFile8* (member of `imFileAccessRec8`, `imSaveFileRec8`, `imDeleteFileRec`, and `imTrimFileRec8`)
`imFrameFormat`	*imGetSourceVideo* (member of `imSourceVideoRec`)
`imGetNextClosedCaptionRec`	*imGetNextClosedCaption*
`imGetPrefsRec`	*imGetPrefs8*
`imImageInfoRec`	*imGetInfo8* (member of `imFileInfoRec8`)

imImportAudioRec7	*imImportAudio7*
imImportImageRec	*imImportImage*
imImportInfoRec	*imInit*
imIndFormatRec	*imGetIndFormat*
imIndPixelFormatRec	*imGetIndPixelFormat*
imInitiateAsyncClosed-CaptionScanRec	*imInitiateAsyncClosedCaptionScan*
imMetaDataRec	*imGetMetaData* and *imSetMetaData*
imPeakAudioRec	*imGetPeakAudio*
imPreferredFrameSizeRec	*imGetPreferredFrameSize*
imQueryContentStateRec	*imQueryContentState*
imQueryDestination-PathRec	*imQueryDestinationPath*
imQueryInputFileListRec	*imQueryInputFileList*
imQueryStreamLabelRec	*imQueryStreamLabel*
imRollCrawlInfoRec	*imGetRollCrawlInfo*
imRollCrawlRenderRec	*imRollCrawlRenderPage*
imSaveFileRec8	*imSaveFile8*
imSourceVideoRec	*imGetSourceVideo*
imSubTypeDescriptionRec	*imGetSubTypeNames*
imTimeInfoRec8	*imGetTimeInfo8* and *imSetTimeInfo8*
imTrimFileRec8	*imTrimFile8*

Structure Descriptions

imAcceleratorRec

Selector: *imRetargetAccelerator*

Describes the path to the new media and new accelerator created when the Project Manager copies media and its accelerator.

```
typedef struct {
     const prUTF16Char   *inOriginalPath;
     const prUTF16Char   *inAcceleratorPath;
} imAcceleratorRec;
```

`inOriginalPath`	The unicode path and name of the copied media.
`inAcceleratorPath`	The unicode path and name of the copied accelerator.

imAnalysisRec

Selector: *imAnalysis*

Sending back analysis data is a two step process. First, set `buffersize` to the size of your character buffer and return `imNoErr`. Premiere will immediately send *imAnalysis* again; populate the buffer with text. Previously-stored preferences and `privateData` are returned in this structure.

```
typedef struct {
     void           *privatedata;
     void           *prefs;
     csSDK_int32    buffersize;
     char           *buffer;
     csSDK_int32    *timecodeFormat;
} imAnalysisRec;
```

`privatedata`	Instance data from *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings data from *imGetPrefs8* (setup dialog info).
`buffersize`	Set to the desired size and return `imNoErr` to Premiere, which will re-size and call the plug-in again with the *imGetPrefs8* selector.
`buffer`	Text buffer. Terminate lines with line endings (CR and LF).
`timecodeFormat`	Preferred timecode format, sent by the host.

imAsyncImporterCreationRec

Selector: *imCreateAsyncImporter*

Create an asynchronous importer object using the data provided, and store it here.

```
typedef struct {
     void                *inPrivateData;
     void                *inPrefs;
     AsyncImporterEntry  outAsyncEntry;
     void                *outAsyncPrivateData;
}
```

`inPrivateData`	Instance data from *imGetInfo8* or *imGetPrefs8*.
`inPrefs`	Clip Source Settings from *imGetPrefs8* (setup dialog info).

`outAsyncEntry`	Provide the entry point for async selectors sent to the asynchronous importer object.
`outAsyncPrivate-Data`	PrivateData for the asynchronous importer object.

imAudioInfoRec7

Selector: *imGetInfo8* (member of `imFileInfoRec8`)

Audio data properties of the file (or of the data you will generate, if synthetic).

```
typedef struct {
     csSDK_int32          numChannels;
     float                sampleRate;
     PrAudioSampleType    sampleType;
}
```

`numChannels`	Number of audio channels in the audio stream. Either 1, 2, or 6.
`sampleRate`	In hertz.
`sampleType`	This is for informational use only, to disclose the format of the audio on disk, before it is converted to 32-bit float, uninterleaved, by the importer. The audio sample types are listed in the Universals chapter.

imCalcSizeRec

Selector: *imCalcSize8*

Asks the importer for an estimate of disk space used by the clip, given the provided trim boundaries.

```
typedef struct {
     void           *privatedata;
     void           *prefs;
     csSDK_int32    trimIn;
     csSDK_int32    duration;
     prInt64        sizeInBytes;
     csSDK_int32    scale;
     csSDK_int32    sampleSize;
} imCalcSizeRec;
```

`privatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings gathered from *imGetPrefs8* (setup dialog info).

`trimIn`	In point of the trimmed clip the importer should calculate the size for, in the timebase specified by scale over sampleSize.
`duration`	Duration of the trimmed clip the importer should calculate the size for. If 0, then the importer should calculate the size of the untrimmed clip.
`sizeInBytes`	Return the calculated size in bytes.
`scale`	The frame rate of the video clip, represented as scale over sampleSize.
`sampleSize`	

imCheckTrimRec

Selector: *imCheckTrim8*

Provides the requested trim boundaries to the importer, and allows adjusted trim boundaries to be passed back to Premiere.

```
typedef struct {
     void           *privatedata;
     void           *prefs;
     csSDK_int32    trimIn;
     csSDK_int32    duration;
     csSDK_int32    keepAudio;
     csSDK_int32    keepVideo;
     csSDK_int32    newTrimIn;
     csSDK_int32    newDuration;
     csSDK_int32    scale;
     csSDK_int32    sampleSize;
} imCheckTrimRec;
```

`privatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings gathered from *imGetPrefs8* (setup dialog info).
`trimIn`	Requested in point of the trimmed clip, in the timebase specified by scale over sampleSize.
`duration`	Requested duration. If 0, then the request is to leave the clip untrimmed, and at the current duration
`keepAudio`	If non-zero, the request is to keep the audio in the trimmed result.
`keepVideo`	If non-zero, the request is to keep the video in the trimmed result.
`newTrimIn`	Return the acceptable in point of the trimmed clip. It must be at or before the requested in point.
`newDuration`	Return the acceptable duration. newTrimIn + newDuration must be at or after the trimIn + duration.
`scale`	The frame rate of the video clip, represented as scale over sampleSize.
`sampleSize`	

imClipFrameDescriptorRec

Selector: *imSelectClipFrameDescriptor*

Based on the request in `inDesiredClipFrameDescriptor` and the importer's Source Settings, modify `outBestFrameDescriptor` as needed to describe what format the importer will provide.

```
typedef struct
{
     void*                     inPrivateData;
     void*                     inPrefs;
     ClipFrameDescriptor       inDesiredClipFrameDescriptor;
     ClipFrameDescriptor       outBestFrameDescriptor;
} imClipFrameDescriptorRec;
```

`inPrivatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`inPrefs`	Clip Source Settings gathered from *imGetPrefs8* (setup dialog info).
`inDesiredClipFrameDescriptor`	Requested frame properties, as described by the host. The `ClipFrameDescriptor` struct is defined in PrSDKImporterShared.h.
`outBestFrameDescriptor`	Frame properties to be produced, filled in with initial guesses

imCompleteAsyncClosedCaptionScanRec

Selector: *imCompleteAsyncClosedCaptionScan*

This structure is passed to provide one last chance to cleanup and dispose of `inAsyncCaptionScanPrivateData`, and to mark whether the closed caption scan completed without error.

```
typedef struct
{
     void*                inPrivateData;
     const void*          inPrefs;
     void*                inAsyncCaptionScanPrivateData;
     prBool               inScanCompletedWithoutError;
} imCompleteAsyncClosedCaptionScanRec;
```

`inPrivatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.

`inPrefs`	Clip Source Settings gathered from *imGetPrefs8* (setup dialog info).
`inAsyncCaption-ScanPrivateData`	Cleanup and dispose of any data here that was allocated in *imInitiateAsyncClosedCaptionScan* or *imGetNextClosedCaption*. This data should not be accessed after returning from this call.
`inScanCompleted-WithoutError`	Set to true if no error.

imIndColorProfileRec

Selector: *imGetIndColorProfile*

Deprecated as of 13.0. Describes a color profile supported by a clip. The first time *imGetIndColorProfile* is sent, `inDestinationBuffer` will be NULL, and `ioBufferSize` will be 0. Set `ioBufferSize` to the required size for the buffer, and the host will allocate the memory and call the importer again, with a valid `inDestinationBuffer`, and `ioBufferSize` set to the value just provided by the importer.

```
typedef struct {
     void                 *inPrivateData;
     csSDK_int32          ioBufferSize;
     void                 *inDestinationBuffer;
     PrSDKString          outName;
} imIndColorProfileRec;
```

imCopyFileRec

Selector: *imCopyFile*

Describes how to copy a clip. Also provides a callback to update the progress bar and check if the user has cancelled.

```
typedef struct {
     void                 *inPrivateData;
     csSDK_int32          *inPrefs;
     const prUTF16Char    *inSourcePath;
     const prUTF16Char    *inDestPath;
     importProgressFunc   inProgressCallback;
     void                 *inProgressCallbackID;
} imTrimFileRec;
```

`inPrivateData`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.

`inPrefs`	Clip Source Settings gathered during *imGetPrefs8* (setup dialog).
`inSourcePath`	Full unicode path of the source file.
`inDestPath`	Full unicode path of the destination file.
`inProgressCallback`	`importProgressFunc` callback to call repeatedly to provide progress and to check for cancel by user. May be a NULL pointer, so make sure the function pointer is valid before calling.
`inProgressCallbackID`	Pass to `progressCallback`.

imDataRateAnalysisRec

Selector: *imDataRateAnalysis*

Specify the desired `buffersize`, return to Premiere with `imNoErr`; upon the next call fill buffer with `imDataSamples`, and specify a base data rate for audio (if any). This structure is used like `imAnalysisRec`.

```
typedef struct {
     void           *privatedata;
     void           *prefs;
     csSDK_int32    buffersize;
     char           *buffer;
     csSDK_int32    baserate;
} imDataRateAnalysisRec;
```

`privatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings gathered from *imGetPrefs8* (setup dialog info).
`buffersize`	The size of the buffer you request from Premiere prior to passing data back data in buffer.
`buffer`	Pointer to the analysis buffer to be filled with imDataSamples (see structure below).
`baserate`	Audio data rate (bytes per second) of the file.

```
typedef struct {
     csSDK_uint32 sampledur;
     csSDK_uint32 samplesize;
} imDataSample;
```

`sampledur`	Duration of one sample in video timebase, in `samplesize` increments; set the high bit if this is a keyframe.
`samplesize`	Size of this sample in bytes.

imDeferredProcessingRec

Selector: *imDeferredProcessing*

Describes the current progress of the deferred processing on the clip referred to by inPrivateData.

```
typedef struct {
     void           *inPrivateData;
     float          outProgress;
     char           outInvalidateFile;
     char           outCallAgain;
} imDeferredProcessingRec;
```

`inPrivateData`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`outProgress`	Set this to the current progress, from 0.0 to 1.0.
`outInvalidateFile`	The importer has updated information about the file.
`outCallAgain`	Set this to true to request that the importer be called again immediately.

imDeleteFileRec

Selector: *imDeleteFile*

Describes the file to be deleted.

```
typedef struct {
     csSDK_int32         filetype;
     const prUTF16Char   deleteFile;
} imDeleteFileRec;
```

`filetype`	The file's unique four character code, defined in the IMPT resource
`deleteFile`	Specifies the name (and path) of the file to be deleted.

imFileAccessRec8

Selectors: *imGetInfo8* and *imGetPrefs8*

Describes the file being imported.

```
typedef struct {
     void                *importID;
     csSDK_int32         filetype;
     const prUTF16Char    *filepath;
     imFileRef            fileref;
     PrMemoryPtr          newfilename;
} imFileAccessRec;
```

`importID`	Unique ID provided by Premiere. Do not modify!
`filetype`	The file's unique four character code, defined in the IMPT resource.
`filepath`	The unicode file path and name.
`fileref`	A Windows `HANDLE`. Premiere does not overload this value by using it internally, although setting it to the constant `kBadFileRef` may cause Premiere to think the file is closed. This value is always valid.
`newfilename`	If the file is synthetic, the importer can specify the displayable name here as a `prUTF16Char` string during *imGetPrefs8*.

imFileAttributesRec

Selector: *imGetFileAttributes*

New in Premiere Pro 3.1. Provide the clip creation date.

```
typedef struct {
     prDateStamp    creationDateStamp;
     csSDK_int32    reserved[40];
} imFileAttributesRec;
```

`creationDateStamp`	Structure to store when the clip was created

imFileInfoRec8

Selector: *imGetInfo8*

Describes the clip, or the stream with the ID `streamIdx`. Set the clip or stream attributes from the file header or data source. Create and store any `privateData`.

When a synthetic clip is created, and the user provides the desired resolution, frame rate, pixel aspect ratio, and audio sample rate in the New Synthetic dialog, these values will be pre-initialized by Premiere.

If importing stereoscopic footage, import the left-eye video channel for streamID 0, and the right-eye video channel for streamID 1.

```
typedef struct {
    char                hasVideo;
    char                hasAudio;
    imImageInfoRec      vidInfo;
    csSDK_int32         vidScale;
    csSDK_int32         vidSampleSize;
    csSDK_int32         vidDuration;
    imAudioInfoRec7     audInfo;
    PrAudioSample       audDuration;
    csSDK_int32         accessModes;
    void                *privatedata;
    void                *prefs;
    char                hasDataRate;
    csSDK_int32         streamIdx;
    char                streamsAsComp;
    prUTF16Char         streamName[256];
    csSDK_int32         sessionPluginID;
    char                alwaysUnquiet;
    char                unused;
    prUTF16Char         filePath[2048];
    char                canProvidePeakData;
    char                mayBeGrowing;
} imFileInfoRec8;
```

`hasVideo`	If non-zero, the file contains video.
`hasAudio`	If non-zero, the file contains audio.
`vidInfo`	If there is video in the file, fill out the `imImageInfoRec` structure (e.g. height, width, alpha info, etc.).
`vidScale`	The frame rate of the video, represented as scale over sampleSize.
`vidSampleSize`	
`vidDuration`	The total number of frames of video, in the video timebase.
`audInfo`	If there is audio in the file, fill out the `imAudioInfoRec7` structure.
`audDuration`	The total number of audio sample frames.

`accessModes`	The access mode of this file. Use one of the following constants: `kRandomAccessImport` - This file can be read by random access (default) `kSequentialAudioOnly` - When accessing audio, only sequential reads allowed (for variable bit rate files) `kSequentialVideoOnly` - When accessing video, only sequential reads allowed `kSequentialOnly` - Both sequential audio and video `kSeparateSequentialAudio` - Both random access and sequential access. This setting allows audio to be retrieved for scrubbing or playback even during audio conforming.
`privatedata`	Private instance data. Allocate a handle using Premiere's memory functions and store it here. Premiere will return the handle with subsequent selectors.
`prefs`	Clip Source Settings data gathered from *imGetPrefs8* (setup dialog info). When a synthetic clip is created using File > New, *imGetPrefs8* is sent before imGetInfo8, so this settings structure will already be valid.
`hasDataRate`	If set, the importer can read or generate data rate information for this file and will be sent *imDataRateAnalysis*.
`streamIdx`	The Premiere-specified stream index number. Only useful if clip uses multiple streams.
`streamsAsComp`	If multiple streams and this is stream zero, indicate whether to import as a composition or multiple clips.
`streamName`	Optional. The unicode name of this stream if there are multiple streams. New in Premiere Pro 3.1, an importer may use this to set the clip name based on metadata rather than the filename. The importer should set `imImportInfoRec.canSupplyMetadataClipName` to true, and fill out the name here.
`sessionPluginID`	This ID should be used in the File Registration Suite for registering external files (such as textures, logos, etc) that are used by an importer instance but do not appear as footage in the Project Window. Registered files will be taken into account when trimming or copying a project using the Project Manager. The sessionPluginID is valid only for the call that it is passed on.
`alwaysUnquiet`	Set to non-zero to tell Premiere if the clip should always be unquieted immediately when the application regains focus.
`filepath`	Added in Premiere Pro 4.1. For clips that have audio in files separate from the video file, set the filename here, so that UMIDs can properly be generated when exporting sequences to AAF.

`canProvidePeak-Data`	New in Premiere Pro CS6. This allows an importer to toggle whether or not it wants to provide peak audio data on a clip-by-clip basis. It defaults to the setting set in `imImportInfoRec.canProvide-PeakAudio`.
`mayBeGrowing`	New in Premiere Pro CS6.0.2. Set to non-zero if this clip is growing and should be refreshed at the interval set in the Media Preferences.

imFileOpenRec8

Selector: *imOpenFile8*

The file Premiere wants the importer to open.

```
typedef struct {
     imFileAccessRec8    fileinfo;
     void                *privatedata;
     csSDK_int32         reserved;
     PrFileOpenAccess    inReadWrite;
     csSDK_int32         inImporterID;
     csSDK_size_t        outExtraMemoryUsage;
     csSDK_int32         inStreamIdx;
} imFileOpenRec8;
```

`fileinfo`	`imFileAccessRec8` describing the incoming file.
`privatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`reserved`	Do not use.
`inReadWrite`	The file should be opened with the access mode specified: Either `kPrOpenFileAccess_ReadOnly` or `kPrOpenFileAccess_ReadWrite`
`inImporterID`	Can be used as the ID for calls in the PPix Cache Suite.
`outExtraMemoryUsage`	New in CS5. If the importer uses memory just by being open, which cannot otherwise be registered in the cache, put the size in bytes in this field.
`inStreamIdx`	New in CS6. If the clip has multiple streams (for stereoscopic video or otherwise), this ID differentiates between them.

imFileRef

Selectors: *imAnalysis*, *imDataRateAnalysis*, *imOpenFile8*, *imQuietFile*, *imCloseFile*, *imGetTimeInfo8*, *imSetTimeInfo8*, *imImportImage*, *imImportAudio7*

A file `HANDLE` on Windows, or a `void*` on MacOS. `imFileRef` is also a member of `im-FileAccessRec`. Use OS-specific functions, rather than ANSI file functions, when manipulating `imFileRef`.

imFrameFormat

Selector: *imGetSourceVideo* (member of `imSourceVideoRec`)

Describes the frame dimensions and pixel format.

```
typedef struct {
     csSDK_int32    inFrameWidth;
     csSDK_int32    inFrameHeight;
     PrPixelFormat  inPixelFormat;
} imFrameFormat;
```

`inFrameWidth`	The frame dimensions requested.
`inFrameHeight`	
`inPixelFormat`	The pixel format of the frame requested.

imGetAudioChannelLayoutRec

Selector: *imGetAudioChannelLayout*

The importer should label each audio channel in the clip being imported. If no labels are specified, the channel layout will be assumed to be discrete.

```
typedef struct {
     void*                inPrivateData;
     PrAudioChannelLabel outChannelLabels[kMaxAudioChannelCount];
} imGetAudioChannelLayoutRec;
```

`inPrivatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`outChannelLabels`	A valid audio channel label should be assigned for each channel in the clip. Labels are defined in the Audio Suite.

imGetNextClosedCaptionRec

Selector: *imGetNextClosedCaption*

This structure provides private data allocated in *imInitiateAsyncClosedCaptionScan*, and should be filled out to pass back a closed caption, it's time, format, size, and overall progress in the closed caption scan.

```
typedef struct {
     void*                    inPrivateData;
     const void*              inPrefs;
     void*                    inAsyncCaptionScanPrivateData;
     float                    outProgress;
     csSDK_int64              outScale;
     csSDK_int64              outSampleSize;
     csSDK_int64              outPosition;
     PrClosedCaptionFormat    outClosedCaptionFormat;
     PrMemoryPtr              outCaptionData;
     prUTF8Char               outTTMLData[kTTMLBufferSize];
     csSDK_size_t             ioCaptionDataSize;
} imGetNextClosedCaptionRec;
```

`inPrivatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`inPrefs`	Clip Source Settings gathered from *imGetPrefs8* (setup dialog info).
`inAsyncCaption-ScanPrivateData`	This provides any private data that was allocated in *imInitiateAsyncClosedCaptionScan*.
`outProgress`	Update this value to denote the current progress iterating through all the captions. Valid values are between 0.0 and 1.0.
`outScale`	The timebase of `outPosition`, represented as scale over sampleSize.
`outSampleSize`	
`outPosition`	The position of the closed caption.
`outClosedCaption-Format`	The format of the closed captions. One of the following: `kPrClosedCaptionFormat_Undefined` `kPrClosedCaptionFormat_CEA608` - CEA-608 byte stream `kPrClosedCaptionFormat_CEA708` - CEA-708 byte stream (may contain 608 data wrapped in 708) `kPrClosedCaptionFormat_TTML` - W3C TTML string that conforms to the W3C Timed Text Markup Language (TTML) 1.0: (http://www.w3.org/TR/ttaf1-dfxp/) or optionally conforming to SMPTE ST 2052-1:2010: (http://store.smpte.org/product-p/st%202052-1-2010.htm), or optionally conforming to EBU Tech 3350 (http://tech.ebu.ch/webdav/site/tech/shared/tech/tech3350.pdf). If the TTML string contains tunneled data (e.g. CEA-608 data), then it is preferred that the plug-in provide that through the appropriate byte stream format (e.g. `kPrClosedCaptionFormat_CEA608`).

`outCaptionData`	Memory location to where the plug-in should write the closed caption bytes, if providing CEA-608 or CEA-708.
`outTTMLData`	UTF-8 String of valid W3C TTML data. The entire string may be split into substrings (e.g. line by line) and the host will concatenate and decode them (only used when `outCaptionData` is `kPrClosedCaptionFormat_TTML`).
`ioCaptionDataSize`	Size of `outCaptionData` buffer (in bytes) allocated from the host. The importer should set this variable to the actual number of bytes that were written to `outCaptionData`, or the length of the string (characters, not bytes) pointed by `outTTMLData`.

imGetPrefsRec

Selector: *imGetPrefs8*

Contains settings/prefs data gathered from (or defaults to populate) a setup dialog. If you are creating media, you can may generate a video preview that includes the background frame from the timeline.

```
typedef struct {
     char           *prefs;
     csSDK_int32    prefsLength;
     char           firstTime;
     PrTimelineID   timelineData;
     void           *privatedata;
     TDB_TimeRecord tdbTimelineLocation;
     csSDK_int32    sessionPluginID;
     csSDK_int32    imageWidth;
     csSDK_int32    imageHeight;
     csSDK_uint32   pixelAspectNum;
     csSDK_uint32   pixelAspectDen;
     csSDK_int32    vidScale;
     csSDK_int32    vidSampleSize;
     float          sampleRate;
} imGetPrefsRec;
```

`prefs`	A pointer to a private structure (which you allocate) for storing Clip Source Settings.
`prefsLength`	Prior to storing anything in the `prefs` member, set `prefsLength` to the size of your structure and return `imNoErr`; Premiere will re-size and call the plug-in again with *imGetPrefs8*.

`firstTime`	If set, *imGetPrefs8* is being sent for the first time. Instead, check to see if prefs has been allocated. If not, *imGetPrefs8* is being sent for the first time. Set up default values for the `prefsLength` buffer and present any setup dialog.
`timelineData`	Can be passed to `getPreviewFrameEx` callback along with `tdbTimelineLocation` to get a frame from the timeline beneath the current clip or timeline location. This is useful for titler plug-ins.
`privatedata`	Private instance data. Allocate a handle using Premiere's memory functions and store it here, if not already allocated in *imGetInfo8*. Premiere will return the handle with subsequent selectors.
`tdbTimelineLocation`	Can be passed to `getPreviewFrameEx` callback along with `timelineData` to get a frame from the timeline beneath the current clip or timeline location. This is useful for titler plug-ins.
`sessionPluginID`	This ID should be used in the File Registration Suite for registering external files (such as textures, logos, etc) that are used by a importer instance but do not appear as footage in the Project Window. Registered files will be taken into account when trimming or copying a project using the Project Manager. The `sessionPluginID` is valid only for the call that it is passed on.
`imageWidth` `imageHeight`	New in CS5. The native resolution of the video.
`pixelAspectNum` `pixelAspectDen`	New in CS5. The pixel aspect ratio of the video.
`vidScale` `vidSampleSize`	New in CS5. The frame rate of the video, represented as scale over sampleSize.
`sampleRate`	New in CS5. Audio sample rate.

imImageInfoRec

Selector: *imGetInfo8* (member of `imFileInfoRec8`)

Describes the video to be imported.

```
typedef struct {
     csSDK_int32    imageWidth;
     csSDK_int32    imageHeight;
     csSDK_uint16   pixelAspectV1;
     csSDK_uint16   depth;
     csSDK_int32    subType;
```

```
    char            fieldType;
    char            fieldsStacked;
    char            reserved_1;
    char            reserved_2;
    char            alphaType;
    matteColRec     matteColor;
    char            alphaInverted;
    char            isVectors;
    char            drawsExternal;
    char            canForceInternalDraw;
    char            dontObscure;
    char            isStill;
    char            noDuration;
    char            reserved_3;
    csSDK_uint32    pixelAspectNum;
    csSDK_uint32    pixelAspectDen;
    char            isRollCrawl;
    char            reservedc[3];
    csSDK_int32     importerID;
    csSDK_int32     supportsAsyncIO;
    csSDK_int32     supportsGetSourceVideo;
    csSDK_int32     hasPulldown;
    csSDK_int32     pulldownCadence;
    csSDK_int32     posterFrame;
    csSDK_int32     canTransform;
    csSDK_int32     interpretationUncertain;
    csSDK_int32     colorProfileSupport;
    PrSDKString     codecDescription;
    csSDK_int32     colorSpaceSupport;
    csSDK_int32     reserved[15];
} imImageInfoRec;
```

Plug-in Info	
`importerID`	Can be used as the ID for calls in the PPix Cache Suite.
`supportsAsyncIO`	Set this to true if the importer supports *imCreateAsyncImporter* and ai* selectors.
`supportsGet-SourceVideo`	Set this to true if the importer supports the *imGetSourceVideo* selector.
Bounds Info	
`imageWidth`	Frame width in pixels.
`imageHeight`	Frame height in pixels.

`pixelAspectNum` `pixelAspectDen`	The pixel aspect ratio numerator and denominator. For synthetic importers, these are by default the PAR of the project. Only set this if you need a specific PAR for the geometry of the synthesized footage to be correct.
Time Info	
`isStill`	If set, the file contains a single frame, so only one frame will be cached.

`noDuration`	One of the following:
	
	`imNoDurationFalse`
	`imNoDurationNoDefault`
	`imNoDurationStillDefault` - use the default duration for stills, as set by the user in the Preferences
	`imNoDurationNoDefault` - the importer will supply it's own duration
	
	This is primarily for synthetic clips, but can be used for importing non-sequential still images.

`isRollCrawl`	Set to non-zero value to specify this clip is a rolling or crawling title. This allows a player to optionally use the RollCrawl Suite to get sections of this title for real-time playback.
`hasPulldown`	Set this to true if the clip contains NTSC film footage with 3:2 pulldown.

`pulldownCadence`	Set this to the enumerated value that describes the pulldown of the clip:
	
	`importer_PulldownPhase_NO_PULLDOWN`
	
	2:3 cadences
	`importer_PulldownPhase_WSSWW`
	`importer_PulldownPhase_SSWWW`
	`importer_PulldownPhase_SWWWS`
	`importer_PulldownPhase_WWWSS`
	`importer_PulldownPhase_WWSSW`
	
	24pa cadences
	`importer_PulldownPhase_WWWSW`
	`importer_PulldownPhase_WWSWW`
	`importer_PulldownPhase_WSWWW`
	`importer_PulldownPhase_SWWWW`
	`importer_PulldownPhase_WWWWS`

`posterFrame`	New in Premiere Pro CS3. Poster frame number to be displayed. If not specified, the poster frame will be the first frame of the clip.

Format Info	
`depth`	Bits per pixel. This currently has no effect and should be left unchanged.
`subType`	The four character code of the file's codec; associates files with MAL plug-ins. For uncompressed files, set to `imUncompressed`.

`fieldType`	One of the following:
	
	`prFieldsNone`
	`prFieldsUpperFirst`
	`prFieldsLowerFirst`
	`prFieldsUnknown`

`fieldsStacked`	Fields are present, and not interlaced.
`alphaType`	Used when `depth` is 32 or greater. One of the following: `alphaNone` - no alpha channel (the default) `alphaStraight` - straight alpha channel `alphaBlackMatte` - premultiplied with black `alphaWhiteMatte` - premultiplied with white `alphaArbitrary` - premultiplied with the color specified in `matteColor` `alphaOpaque` - for video with alpha channel prefilled to opaque. This gives Premiere the opportunity to make an optimization by skipping the fill to opaque that would otherwise be performed if `alphaNone` was set.
`matteColor`	Newly used in Premiere Pro CS3. Used to specify matte color if `alphaType` is set to `alphaArbitrary`.
`alphaInverted`	If non-zero, alpha is treated as inverted (e.g. black becomes transparent).
`canTransform`	Set to non-zero value to specify this importer handles resolution independent files and can apply a transform matrix. The matrix will be passed during the import request in `imImportImageRec.transform`. This code path is currently not called by Premiere Pro. After Effects uses this call to import Flash video.

`interpretationUncertain`	Use an 'or' operator to combine any of the following flags:
	
	`imPixelAspectRatioUncertain`
	`imFieldTypeUncertain`
	`imAlphaInfoUncertain`
	`imEmbeddedColorProfileUncertain`

`colorProfileSupport`	Deprecated as of 13.0. New in CS5.5. Set to `imColorProfileSupport_Fixed` to support color management. If the importer is uncertain, it should use `interpretationUncertain` above instead.
`codecDescription`	Text description of the codec in use.
`ColorProfileRec`	New in 13.0; describes the color profile being used by the importer, with this media.
Unused	
`pixelAspectV1`	Obsolete. Maintained for backwards compatability. Plug-ins written for the Premiere 6.x or Premiere Pro API should use `pixelAspectNum` and `pixelAspectDen`.
`isVectors`	Use `canTransform` instead.
`drawsExternal`	
`canForceInternal-Draw`	
`dontObscure`	

imImportAudioRec7

Selector: *imImportAudio7*

Describes the audio samples to be returned, and contains an allocated buffer for the importer to fill in. Provide the audio in 32-bit float, uninterleaved audio format.

```
typedef struct {
     PrAudioSample  position;
     csSDK_uint32   size;
     float          **buffer;
     void           *privatedata;
     void           *prefs;
} imImportAudioRec7;
```

`position`	In point, in audio sample frames. The importer should save the out point of the request in `privatedata`, because if position is less than zero, then the audio request is sequential, which means the importer should return contiguous samples from the last *imImportAudio7* call.
`size`	The number of audio sample frames to import.
`buffer`	An array of buffers, one buffer for each channel, with length specified in `size`. These buffers are allocated by the host application, for the plug-in to fill in with audio data.

`privatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings data gathered from *imGetPrefs8* (setup dialog info).

imImportImageRec

Selector: *imImportImage*

Describes the frame to be returned.

```
typedef struct {
     csSDK_int32    onscreen;
     csSDK_int32    dstWidth;
     csSDK_int32    dstHeight;
     csSDK_int32    dstOriginX;
     csSDK_int32    dstOriginY;
     csSDK_int32    srcWidth;
     csSDK_int32    srcHeight;
     csSDK_int32    srcOriginX;
     csSDK_int32    srcOriginY;
     csSDK_int32    unused2;
     csSDK_int32    unused3;
     csSDK_int32    rowbytes;
     char           *pix;
     csSDK_int32    pixsize;
     PrPixelFormat  pixformat;
     csSDK_int32    flags;
     prFieldType    fieldType;
     csSDK_int32    scale;
     csSDK_int32    sampleSize;
     csSDK_int32    in;
     csSDK_int32    out;
     csSDK_int32    pos;
     void           *privatedata;
     void           *prefs;
     prRect         alphaBounds;
     csSDK_int32    applyTransform;
     float          transform[3][3];
     prRect         destClipRect;

} imImportImageRec;
```

Bounds Info	
`dstWidth`	Width of the destination rectangle (in pixels).

`dstHeight`	Height of the destination rectangle (in pixels).
`dstOriginX`	Origin X point (0 indicates the frame is drawn offscreen).
`dstOriginY`	Origin Y point (0 indicates the frame is drawn offscreen).
`srcWidth`	The same number returned as `dstWidth`.
`srcHeight`	The same number returned as `dstHeight`.
`srcOriginX`	The same number returned as `dstOriginX`.
`srcOriginY`	The same number returned as `dstOriginY`.
Frame Info	
`rowbytes`	The number of bytes in a single row of pixels.
`pix`	Pointer to a buffer into which the importer should draw. Allocated based on information from the *imGetInfo8*.
`pixsize`	The number of pixels. `rowbytes` * height.
`pixformat`	The pixel format Premiere requests.
`flags`	`imDraftMode` - Draw quickly if possible, using a faster and possibly less accurate algorithm. This may be passed when playing from the timeline. `imSamplesAreFields` - Most importers will ignore as Premiere already scales in/out/scale to account for fields, but if you need to know that this has occurred (because maybe you measure something in 'frames'), check this flag. Also, may we suggest considering measuring in seconds instead of frames?
`fieldType`	If the importer can swap fields, it should render the frame with the given field dominance: either `imFieldsUpperFirst` or `imFieldsLowerFirst`.
`scale` `sampleSize`	The frame rate of the video, represented as scale over sampleSize.
`in`	In point, based on the timebase defined by scale over sampleSize..
`out`	Out point, based on the timebase defined by scale over sampleSize..
`pos`	Import position, based on the above timebase. ***API bug***: Synthetic and custom importers will always receive zero. Thus, adjusting the in point on the timeline will not offset the in point.
`privatedata`	Instance data gathered during *imGetInfo* or *imGetPrefs*.
`prefs`	Clip Source Settings data gathered during *imGetPrefs* (setup dialog info).
`alphaBounds`	This is the rect outside of which the alpha is always 0. Simply do not alter this field if the alpha bounds match the destination bounds. If set, the alpha bounds must be contained by the destination bounds. This is only currently used when a plug-in calls `ppixGetAlphaBounds`, and not currently used by any native plug-ins.

`applyTransform`	New in After Effects CS3. Not currently provided by Premiere. If non-zero, the host is requesting that the importer apply the transform specified in `transform` and `destClipRect` before returning the resulting image in `pix`.
`transform`	New in After Effects CS3. Not currently provided by Premiere. The source to destination transform matrix.
`destClipRect`	New in After Effects CS3. Not currently provided by Premiere. Destination rect inside the bounds of the pix buffer.

imImportInfoRec

Selector: *imInit*

Describes the importer's capabilities to Premiere.

```
typedef struct {
     csSDK_uint32   importerType;
     csSDK_int32    canOpen;
     csSDK_int32    canSave;
     csSDK_int32    canDelete;
     csSDK_int32    canResize;
     csSDK_int32    canDoSubsize;
     csSDK_int32    canDoContinuousTime;
     csSDK_int32    noFile;
     csSDK_int32    addToMenu;
     csSDK_int32    hasSetup;
     csSDK_int32    dontCache;
     csSDK_int32    setupOnDblClk;
     csSDK_int32    keepLoaded;
     csSDK_int32    priority;
     csSDK_int32    canAsync;
     csSDK_int32    canCreate;
     csSDK_int32    canCalcSizes;
     csSDK_int32    canTrim;
     csSDK_int32    avoidAudioConform;
     prUTF16Char    *acceleratorFileExt;
     csSDK_int32    canCopy;
     csSDK_int32    canSupplyMetadataClipName;
     csSDK_int32    private;
     csSDK_int32    canProvidePeakAudio;
     csSDK_int32    canProvideFileList;
     csSDK_int32    canProvideClosedCaptions;
     prPluginID     fileInfoVersion;
} imImportInfoRec;
```

Screen Info	
`noFile`	If set, this is a synthetic importer. The file reference will be zero.
`addToMenu`	If set to `imMenuNew`, the importer will appear in the File > New menu.
`canDoContinuousTime`	If set, the importer can render frames at arbitrary times and there is no set timecode. A color matte generator or a titler would set this flag.
`canCreate`	If set, Premiere will treat this synthetic importer as if it creates files on disk to be referenced for frames and audio. See Additional Details for more information on custom importers.
File handling flags	
`canOpen`	If set, the importer handles open and close operations. Set if the plug-in needs to be called to handle *imOpenFile*, *imQuietFile*, and *imCloseFile*.
`canSave`	If set, the importer handles File > Save and File > Save As after a clip has been captured and must handle the *imSaveFile* selector.
`canDelete`	If set, the importer can delete its own files. The plug-in must handle the *imDeleteFile* selector.
`canCalcSizes`	If set, the importer can calculate the disk space used by a clip during imCalcSize. An importer should support this call if it uses a tree of files represented as one top-level file to Premiere.
`canTrim`	If set, the importer can trim files during imTrimFile.
`canCopy`	Set this to true if the importer supports copying clips in the Project Manager.
Setup flags	
`hasSetup`	If set, the importer has a setup dialog. The dialog should be presented in response to *imGetPrefs*
`setupOnDblClk`	If set, the setup dialog should be opened whenever the user double clicks on a file imported by the plug-in the timeline or the project bin.
Memory handling flags	
`dontCache`	Unused.
`keepLoaded`	If set, the importer plug-in should never be unloaded. Don't set this flag unless it's absolutely necessary (it usually isn't).
Other	

`priority`	Determines priority levels for importers that handle the same filetype. Importers with higher numbers will override importers with lower numbers. For overriding importers that ship with Premiere, use a value of 100 or greater. Higher-priority importers can defer files to lower-priority importers by returning `imBadFile` during *imOpenFile8* or *imGetInfo8*.
`importType`	Type identifier for the import module assigned based on the plug-in's `IMPT` resource. Do not modify this field.
`canProvideClosedCaptions`	New in Premiere Pro CC. Set this to true if the importer supports media with embedded closed captioning.
`avoidAudioConform`	Set this to true if the importer supports fast audio retrieval and does not need the audio clips it imports to be conformed.
`canProvidePeakAudio`	New in Premiere Pro CS5.5. Set this to true if your non-synthetic importer wants to provide ***peak audio data*** using *imGetPeakAudio*.
`acceleratorFileExt`	Fill this `prUTF16Char` array of size 256 with the file extensions of accelerator files that the importer creates and uses.
`canSupplyMetadataClipName`	Allows file based importer to set clip name from metadata. Set this in `imFileInfoRec8.streamName`.
`canProvideFileList`	New in CS6. Set this to true if the importer will provide a list of all files for a copy operation in response to *imQueryInputFileList*.
`fileInfoVersion`	New in CC 2014. This is used by an optimization in an internal importer. Do not use.
Unused	
`canResize`	
`canDoSubsize`	
`canAsync`	

imIndFormatRec

Selector: *imGetIndFormat*

Describes the format(s) supported by the importer. Synthetic files can only have one format.

```
typedef struct {
     csSDK_int32    filetype;
     csSDK_int32    flags;
     csSDK_int32    canWriteTimecode;
     char           FormatName[256];
     char           FormatShortName[32];
     char           PlatformExtension[256];
     prBool         hasAlternateTypes;
```

```
    csSDK_int32    alternateTypes[kMaxAlternateTypes];
    csSDK_int32    canWriteMetaData;
} imIndFormatRec;
```

`filetype`	Unique four character code (fourcc) of the file.
`flags`	Legacy mechanism for describing the importer capabilities. Though the flags will still be honored for backward compatability, current and future importers should not use these flags. See table below for details.
`canWriteTimecode`	If set, timecode can be written for this filetype.
`FormatName[256]`	The descriptive importer name.
`FormatShortName[256]`	The short name for the plug-in, appears in the format menu.
`PlatformExtension[256]`	List of all the file extensions supported by this importer. If there's more than one, separate with null characters.
`hasAlternateTypes`	Unused
`alternateTypes[kMaxAlternateTypes]`	Unused
`canWriteMetaData`	New in 6.0. If set, imSetMetaData is supported for the filetype

The flags listed below are only for legacy plug-ins and should not be used.

Flag	Usage
`xfIsMovie`	Unused
`xfCanReplace`	Unused
`xfCanOpen`	Unused: Use imImportInfoRec.canOpen instead.
`xfCanImport`	Unused: The PiPL resource describes the file as an importer.
`xfIsStill`	Unused: Use imFileInfoRec.imImageInfoRec.isStill instead.
`xfIsSound`	Unused: Use `imFileInfoRec.hasAudio` instead.
`xfCanWriteTimecode`	If set, the importer can respond to imGetTimecode and imSetTimecode. Obsolete: use `imIndFormatRec.canWriteTimecode` instead.
`xfCanWriteMetaData`	Writes (and reads) metadata, specific to the importer's four character code filetype. Obsolete: use `imIndFormatRec.canWriteMetaData` instead.

xfCantBatchProcess	Unused

imIndPixelFormatRec

Selector: *imGetIndPixelFormat*

Describes the pixel format(s) supported by the importer.

```
typedef struct {
     void           *privatedata;
     PrPixelFormat  outPixelFormat;
     const void*    prefs;
} imIndPixelFormatRec;
```

privatedata	Instance data from *imGetInfo8* or *imGetPrefs8*.
outPixelFormat	One of the pixel formats supported by the importer
prefs	New in CC. Clip Source Settings data gathered during *imGet-Prefs8* (setup dialog).

imInitiateAsyncClosedCaptionScanRec

Selector: *imInitiateAsyncClosedCaptionScan*

Both *imGetNextClosedCaption* and *imCompleteAsyncClosedCaptionScan* may be called from a different thread from which imInitiateAsyncClosedCaptionScan was originally called. To help facilitate this, `outAsyncCaptionScanPrivateData` can be allocated by the importer to be used for the upcoming closed caption scan calls, which should then be deallocated in *imCompleteAsyncClosedCaptionScan*.

The estimated duration of all the closed captions can also be filled in. This is useful for certain cases where the embedded captions contain many frames of empty data.

```
typedef struct {
     void*          privatedata;
     void*          prefs;
     void*          outAsyncCaptionScanPrivateData;
     csSDK_int64    outScale;
     csSDK_int64    outSampleSize;
     csSDK_int64    outEstimatedDuration;
} imInitiateAsyncClosedCaptionScanRec;
```

privatedata	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.

`prefs`	Clip Source Settings data gathered during *imGetPrefs8* (setup dialog).
`outAsyncCaptionScan-PrivateData`	The importer can allocate instance data for this closed caption scan, and pass it back here.
`outScale`	New in CC October 2013. The frame rate of the video clip, represented as scale over sampleSize.
`outSampleSize`	
`outEstimatedDuration`	New in CC October 2013. The estimated duration of all the captions, in the above timescale

imMetaDataRec

Selector: *imGetMetaData* and *imSetMetaData*

Describes the metadata specific to a given four character code.

```
typedef struct {
     void            *privatedata;
     void            *prefs;
     csSDK_int32     fourCC;
     csSDK_uint32    buffersize;
     char            *buffer;
} imMetaDataRec;
```

`privatedata`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings data gathered during *imGetPrefs8* (setup dialog).
`fourcc`	Fourcc code of the metadata chunk.
`buffersize`	Size of the data in buffer.
`buffer`	The metadata.

imPeakAudioRec

Selector: *imGetPeakAudio*

Describes the peak values of the audio at the specified position.

```
typedef struct {
     void            *inPrivateData;
     void            *inPrefs;
     PrAudioSample   inPosition;
     float           inSampleRate;
     csSDK_int32     inNumSampleFrames;
     float           **outMaxima;
     float           **outMinima;
} imPeakAudioRec;
```

`inPrivateData`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.
`inPrefs`	Instance data gathered during *imGetPrefs8* (setup dialog).
`inPosition`	The starting audio sample frame of the peak data.
`inSampleRate`	The sample rate at which to generate the peak data.
`inNumSampleFrames`	The number of sample frames in each buffer.
`outMaxima`	An array of arrays to be filled with the maximum sample values.
`outMinima`	An array of arrays to be filled with the minimum sample values.

imPreferredFrameSizeRec

Selector: *imGetPreferredFrameSize*

Describes a frame size preferred by the importer.

```
typedef struct {
     void            *inPrivateData;
     void            *inPrefs;
     PrPixelFormat   inPixelFormat;
     csSDK_int32     inIndex;
     csSDK_int32     outWidth;
     csSDK_int32     outHeight;
} imPreferredFrameSizeRec;
```

`inPrivateData`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.
`inPrefs`	Clip Source Settings data gathered during *imGetPrefs8* (setup dialog).
`inPixelFormat`	The pixel format for this preferred frame size.
`inIndex`	The index of this preferred frame size.
`outWidth`	The dimensions of this preferred frame size.
`outHeight`	

imQueryContentStateRec

Selector: *imQueryContentState*

Fill in the `outContentStateID`, which should be a GUID calculated based on the content state of the clip at `inSourcePath`. If the state hasn't changed since the last call, the GUID returned should be the same.

```
typedef struct {
     const prUTF16Char*  inSourcePath;
     prPluginID          outContentStateID;
} imQueryContentStateRec;
```

imQueryDestinationPathRec

Selector: *imQueryDestinationPath*

Fill in the desired `outActualDestinationPath`, based on the `inSourcePath` and `inSuggestedDestinationPath`.

```
typedef struct {
     void                *inPrivateData;
     void                *inPrefs;
     const prUTF16Char   *inSourcePath;
     const prUTF16Char   *inSuggestedDestinationPath;
     prUTF16Char         *outActualDestinationPath;
} imQueryDestinationPathRec;
```

`inPrivateData`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.
`inPrefs`	Clip Source Settings data gathered during *imGetPrefs8* (setup dialog).
`inSourcePath`	The path of the source file to be trimmed
`inSuggestedDestinationPath`	The path suggested by Premiere where the destination file should be created.
`outActualDestinationPath`	The path where the importer wants the destination file to be created.

imQueryInputFileListRec

Selector: *imQueryInputFileList*

Fill in the `outContentStateID`, which should be a GUID calculated based on the content state of the clip at `inSourcePath`. If the state hasn't changed since the last call, the GUID returned should be the same.

```
typedef struct {
     void*                   inPrivateData;
     void*                   inPrefs;
     PrSDKString             inBasePath;
     csSDK_int32             outNumFilePaths;
     PrSDKString             *outFilePaths;
} imQueryInputFileListRec;
```

`inPrivateData`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`inPrefs`	Clip Source Settings data gathered from *imGetPrefs8* (setup dialog info).
`inBasePath`	Path of main file that was passed earlier in *imOpenFile*.
`outNumFilePaths`	The first time *imQueryInputFileList* is sent, fill in the number of files that the media uses.
`outFilePaths`	The second time *imQueryInputFileList* is sent, this will be preallocated as an array of NULL strings. Use the String Suite to fill the array with PrSDKStrings with the actual paths.

imQueryStreamLabelRec

Selector: *imQueryStreamLabel*

New in CS6. Based on the stream ID passed in, allocate and pass back a label for the stream. For stereoscopic importers, use the predefined labels in PrSDKStreamLabel.h.

```
typedef struct {
     void                    *inPrivateData;
     csSDK_int32             *inPrefs;
     csSDK_int32             inStreamIdx;
     PrSDKString*            outStreamLabel;
} imQueryStreamLabelRec;
```

`privatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings data gathered from *imGetPrefs8* (setup dialog info).
`inStreamIdx`	The ID of the stream that needs to be labeled.
`outStreamLabel`	The stream label, allocated using the String Suite.

imSaveFileRec8

Selector: *imSaveFile8*

Describes the file to be saved.

```
typedef struct {
     void                 *privatedata;
     csSDK_int32          *prefs;
     const prUTF16Char*   sourcePath;
     const prUTF16Char*   destPath;
     char                 move;
     importProgressFunc   progressCallback;
     void                 *progressCallbackID;
} imSaveFileRec8;
```

`privatedata`	Instance data gathered from *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings data gathered from *imGetPrefs8* (setup dialog info).
`sourcePath`	Full path of the file to be saved.
`destPath`	Full path the file should be saved to.
`move`	If non-zero, this is a move operation and the original file (the sourcePath) can be deleted after copying is complete.
`progressCallback`	Function to call repeatedly to provide progress and to check for cancel by user. May be a NULL pointer, so make sure the function pointer is valid before calling.
`progressCallbackID`	Pass to progressCallback.

imSourceVideoRec

Selector: *imGetSourceVideo*, *aiInitiateAsyncRead*, *aiGetFrame*

Describes the requested frame, to be passed back in `outFrame`.

```
typedef struct {
     void                 *inPrivateData;
     csSDK_int32          currentStreamIdx;
     PrTime               inFrameTime;
     imFrameFormat        *inFrameFormats;
     csSDK_int32          inNumFrameFormats;
     bool                 removePulldown;
     PPixHand             *outFrame;
     void                 *prefs;
     csSDK_int32          prefsSize;
     PrSDKString          selectedColorProfileName;
     PrRenderQuality      inQuality;
} imSourceVideoRec;
```

`inPrivateData`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.
`currentStreamIdx`	New in CS6. If the clip has multiple streams (for stereoscopic video or otherwise), this ID differentiates between them.
`inFrameTime`	Time of frame requested.
`inFrameFormats`	An array of requested frame formats, in order of preference. If NULL, then any format is acceptable.
`inNumFrameFormats`	The number of frame formats in the inFrameFormats.
`removePulldown`	If true, pulldown should be removed if the pixel format supports it.
`outFrame`	Allocate memory to hold the requested frame, and pass it back here.
`prefs`	New in Premiere Pro 4.1. prefs data from *imGetPrefs8*
`prefsSize`	New in Premiere Pro 4.1. Size of prefs data.
`selectedColorPro-fileName`	New in Premiere Pro CS5.5. A string that specifies the color pro-file of the imported frame.
`inQuality`	New in Premiere Pro CC 2014.

imSubTypeDescriptionRec

Selector: *imGetSubTypeNames*

Added in Premiere Pro CS3. Describes the codec name associated with a given fourcc.

```
typedef struct {
     csSDK_int32     subType;
     prUTF16Char     subTypeName[256];
} imSubTypeDescriptionRec;
```

imTimeInfoRec8

Selector: *imGetTimeInfo8* and *imSetTimeInfo8*

Describes the timecode and timecode rate associated with a clip.

```
typedef struct {
     void            *privatedata;
     void            *prefs;
     char            orgtime[18];
     csSDK_int32     orgScale;
```

```
    csSDK_int32     orgSampleSize;
    char            alttime[18];
    csSDK_int32     altScale;
    csSDK_int32     altSampleSize;
    char            orgreel[40];
    char            altreel[40];
    char            logcomment[256];
    csSDK_int32     dataType;
} imTimeInfoRec;
```

`privatedata`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip Source Settings data gathered during *imGetPrefs8* (setup dialog).
`orgtime[18]`	The original time in hours;minutes;seconds;frames, as captured from the source reel. The use of semi-colons indicates (to Premiere) drop-frame timecode, e.g. "00;00;00;00". Use colons for non-drop-frame timecode, e.g. "00:00:00:00".
`orgScale` `orgSampleSize`	Timebase of the timecode in orgtime, represented as scale over sampleSize.
`alttime[18]`	An alternative timecode (may differ from the source timecode), formatted as described above.
`altScale` `altSampleSize`	Timebase of the timecode in alttime.
`orgreel[40]`	Original reel name.
`altreel[40]`	Alternate reel name.
`logcomment[256]`	Comment string.
`dataType`	Currently always set to 1, denoting SMPTE timecode. More values may be added in the future.

imTrimFileRec8

Selector: *imGetIndColorSpace*

Describes how to trim a clip, based on information returned by the importer during imCheckTrim8. Also provides a callback to update the progress bar and check if the user has cancelled.

```
typedef struct {
    void                *privatedata;
    void                *prefs;
    csSDK_int32         trimIn;
    csSDK_int32         duration;
    csSDK_int32         keepAudio;
```

```
     csSDK_int32          keepVideo;
     const prUTF16Char    *destFilePath;
     csSDK_int32          scale;
     csSDK_int32          sampleSize;
     importProgressFunc   progressCallback;
     void                 *progressCallbackID;
} imTrimFileRec8;
```

`privatedata`	Instance data gathered during *imGetInfo8* or *imGetPrefs8*.
`prefs`	Clip settings data gathered during *imGetPrefs8* (setup dialog).
`trimIn`	In point of the trimmed clip, in the timebase specified by scale and sampleSize.
`duration`	Duration of the trimmed clip. If 0, then the request is to leave the clip untrimmed, and at the current duration
`keepAudio`	If non-zero, the request is to keep the audio in the trimmed result.
`keepVideo`	If non-zero, the request is to keep the video in the trimmed result.
`destFilePath`	The unicode path and name of the file to create.
`scale`	The frame rate of the video, represented as scale over sampleSize.
`sampleSize`	
`progressCallback`	`importProgressFunc` callback to call repeatedly to provide progress and to check for cancel by user. May be a NULL pointer, so make sure the function pointer is valid before calling.
`progressCallbackID`	Pass to `progressCallback`.

ColorSpaceRec

Selector: *imGetIndColorSpace*

Describes the colorspace in use with the media.

```
typedef struct {
     void                 *privatedata;
     PrSDKColorSpaceType  outColorSpaceType;
     RawColorProfileRec   ioProfileRec;
     prSEIColorCodesRec   outSEICodesRec;
} ColorSpaceRec;
```

`privatedata`	Private.

`outColorSpaceType`	One of the following:
	
	`kPrSDKColorSpaceType_Undefined`
	`kPrSDKColorSpaceType_ICC`
	`kPrSDKColorSpaceType_LUT`
	`kPrSDKColorSpaceType_SEITags`
	`kPrSDKColorSpaceType_MXFTags`

`ioProfileRec`	A structure describing the color profile.
	`csSDK_int32 ioBufferSize;`
	`void*        inDestinationBuffer;`
	`PrSDKString outName;`

`outSEICodesRec`	A structure describing the color profile; used with H.265, HEVC, AVC and ProRes media.
	
	`csSDK_int32    colorPrimariesCode;`
	`csSDK_int32    transferCharacteristicCode;`
	`csSDK_int32    matrixEquationsCode;`
	`csSDK_int32    bitDepth;`
	`prBool         isFullRange;`
	`prBool         isRGB;`

Suites

For information on how to acquire and manage suites, see the SweetPea Suites section.

Async File Reader Suite

New in Premiere Pro CS5. A cross-platform file handling suite.

Deferred Processing Suite

Allows an importer to schedule processing time when importing asynchronously, and to notify the user that the media item is pending additional processing. In the Project panel, the name of the item will be italicized, and its thumbnail will show as Pending.

6

Recorders

Recorders interface directly with capture hardware, and capture video and/or audio to any file format. The recorder is responsible for displaying any video preview in the Capture panel, playing any audio preview to the system sound or hardware output, driving the meters in the Audio Master Meters panel, providing any settings in a custom dialog, and digitizing the video and audio to a file (or multiple files) on disk. A recorder can optionally provide source timecode information to Premiere, and notify Premiere when the video format changes so that the capture preview area can be resized. The recorder does not communicate anything about the audio to Premiere. When recording is complete, Premiere imports the file using any available importers that support that filetype.

A recorder can only capture to a single filetype. To capture to several filetypes, provide several recorders.

If you've never developed a recorder before, you can skip the What's New sections, and go directly to Getting Started.

What's New?

What's New in Premiere Pro CC 2014?

A new return code was added, `rmRequiresRoyaltyContent`. Return this from `recmod_Startup8` or `recmod_StartRecord`, if the codec used is unlicensed.

What's New in Premiere Pro CS6?

The parent window handle is now properly passed in, during *recmod_ShowOptions* when a recorder should display its modal setup dialog.

What's New in Premiere Pro CS5?

Recorders can now display audio meters in the Audio Master Meters panel while previewing and capturing. Just use the new `AudioPeakDataFunc` callback passed in `recOpenParms` with *recmod_Open*.

What's New in Premiere Pro CS4?

Audio settings in the Capture Settings window are no longer supported. Any audio settings should be in the custom dialog shown by the recorder during *recmod_ShowOptions*. Recorders should no longer set the `acceptsAudioSettings` flag in `recInfoRec8`.

No More Project Presets

Since Premiere Pro CS4 support sequence-specific settings, project presets have been replaced by sequence presets. The difference from project presets are that sequence presets do not contain information to initialize capture settings. This means that users will have to initialize capture settings manually the first time they use a recorder with custom settings.

When the Capture Panel is invoked, if the capture settings are invalid or uninitialized, the Capture Settings dialog is invoked. In the Capture Settings dialog: If the recorder requires private data, the user cannot continue past the Capture Settings dialog until they have opened the current recorder's settings dialog.

What's New in Premiere Pro CS3?

A new function, `GetDeviceTimecodeFunc`, can be used to ask the device controller for its current timecode.

A new return value, `rmRequiresCustomPrefsError`, should be returned on *recmod_SetActive* if there are no valid capture prefs.

Getting Started

Selector Calling Sequence

The best ways to get familiar with the recorder API is to observe the messages sent between Premiere and the recorder plug-in.

recmod_Startup8 is sent once when Premiere launches. When Project Settings > Capture Settings is opened, *recmod_Open* is sent to create a new recorder instance and open the capture driver. *recmod_GetSetupInfo8* is then sent, so the recorder can specify which settings buttons (if any) should be enabled in the Capture Settings window when the recorder is selected.

If one or more settings buttons are enabled and then clicked by the user, *recmod_ShowOptions* is sent so the recorder can display a dialog (and save any user choices). When the Capture Settings window is closed, *recmod_Close* is sent to end the capture instance.

Whenever the Capture panel is open, the recorder will receive *recmod_SetActive* calls, with a parameter telling it to become active or inactive (based on user activity). *recmod_SetDisp* provides the plug-in the dimensions of the preview area in the Capture panel. *recmod_Idle* is repeatedly sent until the Record button is pushed, to give the recorder time to update the preview area and play audio coming from the capture hardware.

When the user clicks Record, or starts an In/Out or Batch capture, *recmod_PrepRecord8* is sent. The recorder prepares to capture, and if a start timecode is provided, tells the device controller to get the device into position using `preRollFunc`. The `preRollFunc` will block until the device is exactly in the right position, and when it returns, the recorder should immediately return back to Premiere, open which *recmod_StartRecord* is then sent to the recorder, which should immediately starts capturing.

When the recorder starts capturing and returns from *recmod_StartRecord*, Premiere will repeatedly call *recmod_ServiceRecord* to give the recorder processor time. During recording, report status to Premiere with `StatusDispFunc`.

The capture may be stopped in several ways: The user could click the Stop button, the capture may reach the predetermined out point of an In/Out or Batch capture, or the recorder might return an error from *recmod_ServiceRecord*. In all cases, *recmod_StopRecord* will be sent to stop the capture, possibly followed by *recmod_CloseRecord* if there no more items in the batch. Finally, *recmod_Close* is sent when the Capture panel is closed to destroy the recorder instance.

recmod_Shutdown is sent when Premiere terminates.

Try the Sample Recorder Plug-in

Now that you've read the overview of the selector calling sequence above, build the sample recorder plug-in included with this SDK, and give it a whirl. To properly simulate a capture, you'll also need to create an .sdk media file and place it in the proper location.
1) Build the recorder, importer, and exporter into the plug-ins directory
2) Launch Premiere Pro and use the exporter to transcode any media file into the .sdk file format.
3) Place the newly created media file at "C:\premiere.sdk" on Windows, or "premiere.sdk" on the Desktop on Mac OS.
Now when you "capture" a file, it will use this file, and automatically import it using the importer.

Metadata

Pixel aspect ratio and timecode are provided by the recorder by filling out `recCaptured-FileInfo`. Starting in CS4, after a clip has been captured, if Premiere has an XMP handler that supports the clip's filetype, the XMP handler will open the captured file and inject the information. If no such XMP handler is provided, the recorder is responsible for embedding any pixel aspect ratio information to the file, but Premiere will send *imSetTimeInfo8* to the importer to stamp the file with timecode.

Save Captured File Dialog

After a single clip is captured, the Save Captured File dialog allows the user to rename the filename of the clip just captured. The recorder is not involved in this process. Instead, the importer is called to open the newly captured clip, and it is sent *imSaveFile8* with the move flag set to true to move the file. This is handled by the importer, since *imSaveFile8* is usually already implemented to support the Project Manager.

Switching Preview Area Between Different Frame Sizes

`FormatChangedFunc` enables recorders to tell Premiere when the pixel aspect ratio has changed so the Capture Panel preview area can be resized. It can be called during preview, and even during capture.

Scene Detection

A recorder can optionally implement one or both of two features based on scene detection: Scene Capture and Scene Searching. What determines a scene break is up to the discretion of the recorder. The built-in DV recorder determines scene breaks by time/date breaks in the DV stream. But a recorder could analyze the video for breaks, or use any method it chooses to implement.

Scene Capture

Scene Capture enables a recorder to capture a continuous stream to multiple files divided up by scenes.

To support scene capture, the recorder must set `recInfoRec8.canCaptureScenes = kPrTrue` during *recmod_Startup8*. When the user captures with Scene Detect on, `recCap-ParmsRec8.captureScenes` will be non-zero during *recmod_PrepRecord8*. The recorder should begin capture, and when it detects the end of a scene, call `SceneCapturedFunc8`, to notify Premiere that a scene has been captured. Premiere passes back the `recFileSpec8` to give the recorder the filepath to which the next scene should be captured. Premiere also reserves memory for and passes back `recCapturedFileInfo` for the next capture.

Scene Searching

Scene Searching enables a recorder to fast forward or rewind to different scenes. The user can hit the Next Scene or Previous Scene buttons several times to seek several scenes away. Of course, this feature is only possible with the help of a device controller as well.

To support scene capture, the recorder must set `recInfoRec8.canSearchScenes = kPrTrue` during *recmod_Startup8*. When the user chooses Next Scene or Previous Scene, the recorder is sent *recmod_StartSceneSearch*. The scene searching algorithm happens in two passes. The first pass is a play fast forward or backward in the initial direction. In this mode, when the recorder passes the scene boundary, it should call `ReportSceneFunc` to tell Premiere the approximate range where the scene boundary is and return `rmEndOfScene`. Premiere will call *recmod_StopSceneSearch*, followed by *recmod_StartSceneSearch*, to start a new slow scan scene search in the opposite direction, passing back the approximate range reported by `ReportSceneFunc`. When the recorder reaches the scene boundary again, it should once again call `ReportSceneFunc` and return `rmEndOfScene`.

Entry Point

Below is the entry point function prototype for all recorder plug-ins. Premiere calls this entry point function to drive the recorder based on user input.

```
int RecEntry (
     csSDK_int32     selector,
     rmStdParms      *stdParms,
     void            *param1,
     void            *param2)
```

The *selector* is the action Premiere wants the recorder to perform. It tells the recorder the reason for the call. `stdParms` provides the recorder with callback functions to access additional information from Premiere or to have Premiere perform tasks. Parameters 1 and 2 contain state information and vary with the selector; they may contain a specific value or a pointer to a structure. Return `rmNoErr` if successful, or an appropriate return code.

Standard Parameters

This structure is sent from Premiere to the plug-in with every selector.

```
typedef struct {
     int                   rmInterfaceVer;
     recCallbackFuncs      *funcs;
     piSuitesPtr           piSuites;
} rmStdParms;
```

Member	Description
`rmInterfaceVer`	Recorder API version Premiere Pro CS6 - `RECMOD_VERSION_12` Premiere Pro CS5.5 - `RECMOD_VERSION_11` Premiere Pro CS5 - `RECMOD_VERSION_10` Premiere Pro CS4 - `RECMOD_VERSION_9` Premiere Elements 3 - `RECMOD_VERSION_8` Premiere Pro CS3 - `RECMOD_VERSION_7`
`funcs`	Pointers to callbacks for recorders
`piSuites`	Pointer to universal callback suites

Recorder-Specific Callbacks

Recorders have access to ClassData Functions and Memory Functions through the `recCall-backFuncs`, which is a member of `rmStdParms`. `StatusDispFunc`, `PrerollFunc`, `ReportSceneFunc`, and `SceneCapturedFunc8` are accessible through `recCapParms-Rec8`, which is sent with *recmod_PrepRecord8*.

```
typedef struct {
     ClassDataFuncsPtr    classFuncs;
     PlugMemoryFuncsPtr   memoryFuncs;
} recCallbackFuncs;

int (*StatusDispFunc){
     void *callbackID,
     char *stattext,
     int  framenum};

csSDK_int32 (*PrerollFunc)(
     void *callbackID);

void (*ReportSceneFunc)(
     void           *callbackID,
     csSDK_uint32   inSceneEdgeTimecode,
     csSDK_uint32   inEarliestSceneEdgeTimecode,
     csSDK_uint32   inGreatestSceneEdgeTimecode);

void (*SceneCapturedFunc8)(
     void                *callbackID,
     prUTF16Char         *inFileCaptured,
     recFileSpec8        *outNextSceneFilename,
     recCapturedFileInfo **outFileInfo);

void (*SceneCapturedFunc)(
     void                *callbackID,
     char                *inFileCaptured,
     recFileSpec         *outNextSceneFilename,
     recCapturedFileInfo **outFileInfo);

void (*FormatChangedFunc)(
     void           *callbackID,
     unsigned int   inPixelAspectRatioNum,
     unsigned int   inPixelAspectRatioDen,
     unsigned int   inMaxFrameWidth,
     unsigned int   inMaxFrameHeight,
     TDB_TimeRecord inFramerate,
     int            isDropFrame);

void (*GetDeviceTimecodeFunc)(
     void           *callbackID,
     csSDK_uint32   *outTimecode,
     TDB_TimeRecord *outFrameRate,
     int            *outIsDropFrame);

void (*AudioPeakDataFunc)(
     void                *callbackID,
     recAudioPeakData    *inAudioPeakData)
```

Function	Description
`classFuncs`	See ClassData functions
`memoryFuncs`	Legacy memory-related callbacks. These are the same ones passed in through piSuites.

`StatusDispFunc`	Available in `recCapParmsRec8` during *recmod_PrepRecord8*. Callback function pointer for use during capture to call into Premiere and update status information in the Capture Window. `callbackID` is the recording session instance passed in `recCapParmsRec`. `stattext` is text Premiere will display at the top of the Capture Window. `framenum` is the frame number being captured, represented in the absolute number of frames. For example, 00;00;04;03 in NTSC drop-frame timecode would be represented as 123.
`PrerollFunc`	Available in `recCapParmsRec8` during *recmod_PrepRecord8*, only if the user has initiated a device controlled capture (Capture In/Out or Batch Capture). Callback function pointer to initiate device control preroll, by sending a *dsExecute*/*cmdLocate* message to the device controller. Callback returns when the deck is playing at the proper frame. `callbackID` is the recording session instance passed in `recCapParmsRec`. Host returns a `prDevicemodError` to inform why the preroll failed.
`ReportSceneFunc`	Although this callback is obsolete for Scene Capture (superceded by `SceneCapturedFunc8`), it is still used for Scene Search to return the scene detected by the recorder. Available in `recSceneDetectionParmsRec` during *recmod_StartSceneSearch*. The `inSceneEdgeTimecode` parameter marks the timecode of the scene edge, if it can be determined exactly. If it cannot, it marks the approximated timecode of the edge, and the `inEarliestSceneEdgeTimecode` and `inGreatestSceneEdgeTimecode` parameters mark the earliest and latest possible timecodes that the scene would fall in between. If the scene break can be determined exactly, all three return parameters should be set to the same value.

SceneCapturedFunc8	New in Premiere Pro 2.0. Available in recCapParms-Rec8 during *recmod_PrepRecord8*. Callback to notify Premiere that a scene has been captured. Premiere returns the recFileSpec8 to designate a filename for the next scene to capture and reserves memory for and returns recCapturedFileInfo for the next capture.
SceneCapturedFunc	Obsolete. Use SceneCapturedFunc8 above.
FormatChangedFunc	Available in recOpenParms during *recmod_Open*. Use this when the pixel aspect ratio has changed so the Capture Panel can be resized. It can be called during pre-view, and even during capture.
GetDeviceTimecodeFunc	New in Premiere Pro CS3. Used to ask the device control-ler for its current timecode.
AudioPeakDataFunc	New in Premiere Pro CS5. Available in recOpenParms during *recmod_Open*. Use this to display audio meters in the Audio Master Meters panel while previewing and cap-turing. The values will be updated as long as the capture panel is active or front. This call can be made from any thread, at any time. Metering can be provided for up to 16 channels, in any configuration desired: 1, 2, 4, 6/5.1, 8, or 16. The recorder provides the peak amplitude in longAm-plitude, and the current audio amplitude in short-Amplitude. The recorder can decide whether to pick a single value in longAmplitude, or do an average over the sound data. In Premiere Pro's built-in recorders, the long term peak data is currently buffered for 3 seconds at a time. If no new data is sent, it stays on the last value. So set the amplitude values to zero when finished.

Selector Table

This table summarizes the various selector commands a recorder can receive.

Selector	param1	param2
recmod_Startup8	recInfoRec8 *	unused
recmod_Shutdown	unused	unused
recmod_GetSetupInfo8	PrivateData	recCapSetups8

recmod_ShowOptions	`PrivateData`	`recSetupParms`
recmod_Open	`PrivateData`	`recOpenParms`
recmod_Close	`PrivateData`	unused
recmod_SetActive	`PrivateData`	`(csSDK_int32)boolean toggle`
recmod_SetDisp	`PrivateData`	`recDisplayPos`
recmod_Idle	`PrivateData`	`recGetTimecodeRec`
recmod_PrepRecord8	`PrivateData`	`recCapParmsRec8`
recmod_StartRecord	`PrivateData`	`recCapturedFileInfo`
recmod_ServiceRecord	`PrivateData`	unused
recmod_StopRecord	`PrivateData`	unused
recmod_CloseRecord	`PrivateData`	unused
recmod_QueryInfo	`PrivateData`	`recCapInfoRec`
recmod_StartSceneSearch		`recSceneDetection-ParmsRec` *
recmod_StopSceneSearch		unused
recmod_ServiceSceneSearch		unused
Obsolete - *recmod_Startup, recmod_GetSetupInfo, recmod_PrepRecord*		
Currently unused in CS4 - *recmod_QueryInfo, recmod_AudioIndFormat, recmod_GetAudioIndFormat7, recmod_StepRecord, recmod_StillRecord*		

Selector Descriptions

This section provides a brief overview of each selector and highlights implementation issues.

recmod_Startup8

```
param1 - recInfoRec8
param2 - unused
```

Sent once when Premiere launches so the plug-in can initialize and return its attributes to Premiere. The module should connect to any required capture hardware or drivers and fill in the `recInfoRec8`.

recmod_Shutdown

```
param1 - unused
param2 - unused
```

Sent when Premiere terminates. Deallocate any memory and release the capture hardware or driver.

recmod_GetSetupInfo8

```
param1 - PrivateData
param2 - recCapSetups8
```

Sent when the Capture Settings dialog is first displayed to obtain custom settings information. `recCapSetups8` provides text label fields button titles and enabling.

recmod_ShowOptions

```
param1 - PrivateData
param2 - recSetupParms
```

Sent when the user presses a settings button (one of four available) in the Capture Settings dialog. Request settings buttons during *recmod_GetSetupInfo8*.

`recSetupParms` indicates which button was pushed. If the `char *` passed in `recSetupParms` isn't NULL, it points to memory containing private data; otherwise, no previous settings are available. All the setup dialogs share the same memory; only one record is preserved. If there are several different setup records, they should all fit within one flattened memory allocation.

recmod_Open

```
param1 - PrivateData
param2 - recOpenParms
```

Sent when Premiere's New Project Settings > Capture Settings dialog or the Movie Capture window is displayed. Initialize hardware, create a private data structure for instance data, and pass a pointer to it back in param1. It will be sent back to you with subsequent selectors. `recOpenParms` contains information about the capture window and callbackID; store this information in private instance data.

recmod_Close

```
param1 - PrivateData
param2 - unused
```

Capture is complete and the capture window is closed. Disconnect from the hardware and deallocate the private instance data.

recmod_SetActive

```
param1 - PrivateData
param2 - boolean toggle
```

`param2` indicates whether the plug-in should activate. When a capture window is opened or receives the focus, it will be activated.

recmod_SetDisp

```
param1 - PrivateData
param2 - recDisplayPos
```

Sent when the capture window is resized or moved. Update a proxy or overlay in the capture window during capture. `recDisplayPos` specifies the new bounds. If they are unacceptable, modify them; the selector will be sent again with the new position. Set `mustresize` in `recDisplayPos` to resize the preview frame with the specified bounds. The plug-in is not allowed to resize the capture window, just the preview frame. If `mustresize` is set but the plug-in can't resize the frame, display something (black, grey, a graphic of your choice) for a preview. `mustresize` will be set when the Capture Settings dialog is being displayed.

recmod_Idle

```
param1 - PrivateData
param2 - recGetTimecodeRec *
```

Sent to give the plug-in processing time.

recmod_PrepRecord8

```
param1 - PrivateData
param2 - recCapParmsRec8
```

Set up for recording, based on the data in `recInfoRec8`. If the `prerollFunc` callback function pointer is valid, call it to tell the device controller to get the device ready. Recording commences with the next selector, *recmod_StartRecord*.

If pressing the record button results in a recorder error before the *recmod_PrepRecord8* selector is even sent, make sure that the `fileType` four character code set in `recInfoRec8` is supported by an installed importer.

recmod_StartRecord

```
param1 - PrivateData
param2 - recCapturedFileInfo *
```

Sent after *recmod_PrepRecord*. Start capturing immediately. The pointer to `recCaptured-FileInfo` is valid until the recording finishes.

recmod_ServiceRecord

```
param1 - PrivateData
param2 - unused
```

Sent repeatedly to give the plug-in processor time while recording.

recmod_StopRecord

```
param1 - PrivateData
param2 - unused
```

Stop recording and release record buffers.

recmod_CloseRecord

```
param1 - PrivateData
param2 - unused
```

Sent after *recmod_StopRecord*. During batch capturing, *recmod_StopRecord* will be called after every clip, but *recmod_CloseRecord* will not be called until after the last clip has been captured, to finalize the record process.

recmod_QueryInfo

```
param1 - PrivateData
param2 - recCapInfoRec *
```

Sent when the user hits the Log Clip button in the Capture panel. The recorder should provide the dimensions, pixel aspect ratio, and other attributes to be assigned to the offline clip. If the dimensions are not provided, the maxWidth/maxHeight values set in `recInfoRec8` will be used, which may be incorrect if the recorder supports multiple video resolutions.

Return Codes

Return Code	Reason
`rmNoErr`	Operation has completed without error.
`rmUnsupported`	Unsupported command selector.
`rmAudioRecordError`	Audio recording error.
`rmVideoRecordError`	Video recording error.
`rmVideoDataError`	Data rate too high to record (return this if too many frames get dropped).
`rmDriverError`	Driver error.
`rmMemoryError`	Memory error.
`rmDiskFullError`	Disk full.
`rmDriverNotFound`	Can't connect to the capture driver.
`rmStatusCapture-Done`	Return from *recmod_StartRecord* when capture is complete.
`rmCaptureLimit-Reached`	Return from *recmod_ServiceRecord* when the (self-imposed) record limit time is reached.
`rmBadFormatIndex`	Invalid format index - stops *recmod_GetAudioIndFormat* queries from Premiere.
`rmFormatAccept`	The output format is valid.
`rmFormatDecline`	Cannot capture to this format.
`rmErrorPreroll-Abort`	Preroll function aborted.
`rmUserAbort`	Return from *recmod_StartRecord* if user aborts.
`rmErrFileSize-LimitErr`	Return from *recmod_ServiceRecord* if file size limit was reached.
`rmFramesDropped`	Return value to use for dropped frames.
`rmDeviceRemoved`	The device was removed during capture. Premiere assumes all material captured before this value as valid.
`rmDeviceNotFound`	The capture device was not found.
`rmCapturedNoFrames`	No frames were captured.
`rmEndOfScene`	If detecting scenes and recorder senses end of scene
`rmNoFrameTimeout`	Haven't seen any frames in a while, maybe the tape stopped or hit blank part of tape
`rmCantDetect-ScenesError`	If the recorder can't find the info it needs to properly judge scene bounds

`rmCantFindRecord-InPoint`	If capturing in to out and the recorder can't find the in point timecode
`rmLastErrorSet`	The recorder set the last error string using the SweetPea Error Suite
`rmLastWarningSet`	The recorder set the last warning string using the SweetPea Error Suite
`rmLastInfoSet`	The recorder set the last info string using the SweetPea Error Suite
`rmIllegalAudio-FormatChange`	Return when two different audio formats are recorded on a tape and the user tries to capture frames from both in a single capture.
`rmRequiresCustom-PrefsError`	New for Premiere Pro CS3. Return when no valid capture prefs are found during *recmod_SetActive*.
`rmErrBadFile`	Problem with output file.
`rmIsCacheable`	Return from *recmod_Startup8* if the plug-in is cacheable, `rmNo-Error` if not cacheable
`rmRequiresRoyalty-Content`	New for Premiere Pro CC 2014. Return from `recmod_Startup8` or `recmod_StartRecord`, if the codec used is unlicensed.

Structures

Structure	Sent with selector
`recInfoRec8`	*recmod_Startup8*
`recCapSetups8`	*recmod_GetSetupInfo8*
`recDisplayPos`	*recmod_SetDisp*, *recmod_Open* (member of `re-cOpenParms`)
`recOpenParms`	*recmod_Open*
`recCapturedFileInfo`	*recmod_StartRecord*
`recFileSpec8`	*recmod_PrepRecord8* (member of `recCapParm-sRec8`)
`recSetupParms`	*recmod_ShowOptions*
`recCapParmsRec8`	*recmod_PrepRecord8*
`recGetTimecodeRec`	*recmod_Idle*
`recCapInfoRec`	*recmod_QueryInfo*
`recSceneDetectionParmsRec`	*recmod_StartSceneSearch*
Obsolete - `recInfoRec, recCap-Setups, recFileSpec, recCap-ParmsRec`	

Structure Descriptions

recInfoRec8

Selector: *recmod_Startup8*

Describes the recorder's capabilities to Premiere.

```
typedef struct {
     csSDK_int32    recmodID;
     csSDK_int32    fileType;
     csSDK_int32    classID;
     int            canVideoCap;
     int            canAudioCap;
     int            canStepCap;
     int            canStillCap;
     int            canRecordLimit;
     int            acceptsTimebase;
     int            acceptsBounds;
     int            multipleFiles;
     int            canSeparateVidAud;
     int            canPreview;
     int            wantsEvents;
     int            wantsMenuInactivate;
     int            acceptsAudioSettings;
     int            canCountFrames;
     int            canAbortDropped;
     int            requestedAPIVersion;
     int            canGetTimecode;
     int            reserved[16];
     csSDK_int32    prefTimescale;
     csSDK_int32    prefSamplesize;
     csSDK_int32    minWidth;
     csSDK_int32    minHeight;
     csSDK_int32    maxWidth;
     csSDK_int32    maxHeight;
     int            prefAspect;
     csSDK_int32    prefPreviewWidth;
     csSDK_int32    prefPreviewHeight;
     prUTF16Char    recmodName[256];
     csSDK_int32    audioOnlyFileType;
     int            canSearchScenes;
     int            canCaptureScenes;
```

```
    prPluginID     outRecorderID;
} recInfoRec, *recInfoPtr;
```

`recmodID`	Premiere's internal identifier for the plug-in. Never change this value.
`fileType`	Four character code for the captured file (for example `'AVIV'` for Video for Windows .AVI files, and `'MOOV'` for QuickTime .MOV files). Invent a unique code for proprietary formats as necessary, but make sure an importer is installed that supports the fourcc. If no such importer is installed, pressing the record button will result in a recorder error before the recmod_PrepRecord selector is even sent.
`classID`	Class identifier, used to differentiate between plug-ins that support the same fileType. ClassID is the identifying characteristic of plug-ins which form a media abstraction layer.
`canVideoCap`	If set, the recorder can capture video.
`canAudioCap`	If set, the recorder can capture audio
`canStepCap`	Unused
`canStillCap`	Unused
`canRecordLimit`	If set, the recorder can accepts recording time limits. The recorder will receive the user-specified record limit in `recCapParmsRec.recordlimit`. The plug-in must enforce the time limit during capture.
`acceptsTimebase`	If set, the recorder can capture to an arbitrary timebase.
`acceptsBounds`	If set, the recorder can capture to an arbitrary frame size.
`multipleFiles`	Unused
`canSeparateVidAud`	Unused
`canPreview`	Unused
`wantsEvents`	Unused
`wantsMenuInactivate`	Unused
`acceptsAudioSettings`	Unused, do not set
`canCountFrames`	If set, the recorder is expected to count frames and quit when the count is reached.
`canAbortDropped`	If set, the recorder can abort when frames are dropped
`requestedAPIVersion`	Unused

`canGetTimecode`	Can provide timecode from the capture stream (like DV).
`reserved[16]`	Do not use.
`activeDuringSetup`	If set, that the recorder shouldn't be deactivated before a *recmod_GetSetupInfo8* selector is issued
`prefTimescale`	Frames per second, in scale over sampleSize.
`prefSamplesize`	
`minWidth`	Define the minimum and maximum frame sizes the plug-in can capture. If the plug-in can only capture to a single fixed size, then set them to the same value.
`minHeight`	
`minWidth`	
`minHeight`	
`prefAspect`	Preferred frame aspect ratio for the captured frames. Shift the width into the high order word and the height into the low order word. For example, store 640x480 (a 4:3 aspect ratio) as: `prefAspect = (640 << 16) + 480;`
`prefPreviewWidth`	Unused
`prefPreviewHeight`	Unused
`recmodName[256]`	The recorder's name (appears in the Capture Format pulldown menu).
`audioOnlyFileType`	File type for audio-only captures. If 0, the video file type will be used.
`canSearchScenes`	If true, the recorder can detect a scene boundary for searching purposes
`canCaptureScenes`	If true, the recorder can identify when it has reached the end of a scene
`outRecorderID`	New in Premiere Pro 2.0. A GUID identifier is now required for all recorders. Editing Mode XMLs use these GUIDs to refer to recorders.

recCapSetups8

Selector: *recmod_GetSetupInfo8*

Enumerate custom setup buttons for the Capture Settings dialog, and pull-down menu items in the Capture panel.

```
typedef struct {
     int              customSetups;
     csSDK_int32      enableflags;
     recSetupItem8    setups[4];
} recCapSetups8;
```

`customSetups`	Number of setup buttons (up to 4).
`enableflags`	Bitstring where bits 0 to 3 correspond with setups 1 to 4. Set the appropriate bits to indicate to Premiere which setups should be enabled
`setups[4]`	Four `recSetupItem8`s used to label the setup buttons. A `recSetupItem8` is just a `prUTF-16Char[256]`.

recDisplayPos

Selector: *recmod_SetDisp*, *recmod_Open* (member of `recOpenParms`)

Describes the display position for preview frames.

```
typedef struct {
     prWnd     wind;
     int       originTop;
     int       originLeft;
     int       dispWidth;
     int       dispHeight;
     int       mustresize;
} recDisplayPos;
```

`wind`	The window.
`originTop`	`originTop` and `originLeft` identify the offset in pixels from the top left of the window in which to display.
`originLeft`	
`dispWidth`	Display area dimensions.
`dispHeight`	
`mustresize`	If set, the video must be resized to fit within these bounds (see *recmod_SetDisp*).

recOpenParms

Selector: *recmod_Open*

Provides capture session information; save this information in private instance data.

```
typedef struct {
     recDisplayPos       disp;
     void                *callbackID;
     char                *setup;
     FormatChangedFunc   formatFunc;
     AudioPeakDataFunc   audioPeakDataFunc;
} recOpenParms;
```

`disp`	Preview display area
`callbackID`	Premiere's instance identifier for this recording session. Save this value for use with callback routines.
`setup`	If not null, points to settings saved from a previous recording session.
`formatFunc`	Use to inform Premiere of a new aspect ratio so the Capture panel can be updated
`audioPeakDataFunc`	New in CS5. Callback function to send audio metering data to be displayed by Premiere in the Audio Master Meters panel.

recCapturedFileInfo

Selector: *recmod_StartRecord*

Provide pixel aspect ratio and starting timecode of the captured clip.

```
typedef struct {
     unsigned int   pixelAspectRatioNum;
     unsigned int   pixelAspectRatioDen;
     char           timeCode[31];
     TDB_TimeRecord tdb;
     char           date[31];
} recCapturedFileInfo;
```

`pixelAspectRatioNum` `pixelAspectRatioDen`	Fill in the clip's pixel aspect ratio.
`timeCode`	Provide the text representation of the starting timecode, as known by the recorder. If the recorder can provide it, and it is non-zero then fill this in. Don't fill this in if the timecode is zero. As of CS5.5, that will result in odd starting timecodes, such as "08;06;40;11".
`tdb`	Timebase of the captured file.

`date`	New in Premiere Elements 7. The date of the the captured file, formatted in one of the following ways: "d/m/y" or "d/m/y h:m" or "d/m/y h:m:s"

recFileSpec8

Selector: *recmod_PrepRecord8* (member of `recCapParmsRec8`)

Used to describe the capture destination file.

```
typedef struct {
     short          volID;
     csSDK_int32    parID;
     prUTF16Char    name[kPrMaxPath];
} recFileSpec8;
```

`volID`	Unused
`parID`	Unused
`name`	Full file path.

recSetupParms

Selector: *recmod_ShowOptions*

Indicates which settings dialog should be displayed, and provides any previously saved settings.

```
typedef struct {
     uintptr_t parentwind;
     int       setupnum;
     char      *setup;
} recSetupParms;
```

`parentwind`	Parent window owner.
`setupnum`	Which setup button (1-4) was selected by the user.
`setup`	If not null, points to saved settings from previous sessions.

recCapParmsRec8

Selector: *recmod_PrepRecord8*

Specifies capture settings.

```
typedef struct {
     void                        *callbackID;
     int                         stepcapture;
     int                         capVideo;
     int                         capAudio;
     int                         width;
     int                         height;
     csSDK_int32                 timescale;
     csSDK_int32                 samplesize;
     csSDK_int32                 audSubtype;
     csSDK_uint32                audrate;
     int                         audsamplesize;
     int                         stereo;
     char                        *setup
     int                         abortondrops;
     int                         recordlimit;
     recFileSpec8                thefile;
     StatusDispFunc              statFunc;
     PrerollFunc                 prerollFunc;
     csSDK_int32                 frameCount;
     char                        reportDrops;
     short                       currate;
     short                       timeFormat;
     csSDK_int32                 timeCode;
     csSDK_int32                 inHandleAmount;
     ReportSceneFunc             reportSceneFunc;
     int                         captureScenes;
     SceneCapturedFunc8          sceneCapturedFunc;
     bool                        recordImmediate;
     GetDeviceTimecodeFunc       getDeviceTimecodeFunc;
} recCapParmsRec8;
```

`callbackID`	Premiere's instance identifier for this recording session. Save this value for use with callback routines.
`stepcapture`	Unused
`capVideo`	If set, capture video.
`capAudio`	If set, capture audio.

`width` `height`	Dimensions of the video frames to capture. These are only sent if `acceptsBounds` was set in the recInfoRec. If the plug-in doesn't accept bounds, capture to the preferred dimensions we previously set in `recInfoRec8`.
`timescale` `samplesize`	Recording timebase. Only sent if `acceptsTimebase` was set in the `recInfoRec8`. Otherwise, capture using the timebase we previously set in `recInfoRec8`. This supercedes `currate` below.

`audSubtype`
`audrate`
`audsamplesize`
`stereo`
	Unused

`setup`	Pointer to private instance data allocated in response to *recmod_GetSetupInfo8*.
`abortondrops`	If set, stop capture if frames are dropped.
`recordlimit`	Recording time limit, in seconds, only valid if `canRecordLimit` was set in `recInfoRec8`. Value passed in by Premiere. The plug-in must enforce the limit during capture.
`thefile`	Structure of type `recFileSpec8` describing the capture destination file, only valid during *recmod_PrepRecord8*.
`statFunc`	Callback function pointer for use during capture to call into Premiere and update status information in the Capture Panel. See StatusDispFunc for more information.
`preroll`	Callback function pointer to initiate device control pre-roll. This callback is only initialized if it will be needed, meaning only it if doing an in/out capture or batch capture. Otherwise, this function pointer to be set to NULL. See PrerollFunc for more information.
`frameCount`	If `canCountFrames` was set in `recInfoRec8`, the number of frames to capture. No device polling will be done.
`reportDrops`	If non-zero, report dropped frames when they occur (by returning `rmErrVidDataErr`).
`currate`	Frames per second to capture at (23, 24, 25, 30, 59). This is superceded by `timescale` / `samplesize` above.

timeFormat	0 = non-drop frame, 1 = drop frame timecode.
timeCode	Timecode for in-point of capture (-1 means ignore).
inHandleAmount	Number of frames of handle (buffered lead-in), previous to the user-specified capture in point, the record module requires.
reportSceneFunc	Obsolete. Use `sceneCapturedFunc8` instead.
captureScenes	True if user has initiated scene capture
sceneCapturedFunc	Use this callback during scene capture to report the end of a scene
recordImmediate	If non-zero, begin recording immediately after device control returns from seek for pre-roll; don't wait for a timecode.
getDeviceTimecodeFunc	New for Premiere Pro CS3. Use this callback to ask the device controller for its current timecode.

recGetTimecodeRec

Selector: *recmod_Idle*

Allows the recorder to supply timecode information.

```
typedef struct {
     csSDK_int32    status;
     short          currate;
     short          timeFormat;
     csSDK_int32    timeCode;
     short          autoDetectDropness;
} recGetTimecodeRec;
```

status	0 indicates valid timecode, 1 indicates it's unknown or stale.
currate	30 for NTSC timecode, 25 for PAL.
timeFormat	0 for non-drop, 1 for drop-frame timecode.
timeCode	Timecode as an integer, represented in the absolute number of frames. For example, 00;00;04;03 in NTSC drop-frame timecode would be represented as 123.

autoDetectDropness	Non-zero if device controller has set DeviceRec.autoDetectDropness to true. This means that the device controller is relying on the recorder to determining whether the timecode is drop-frame or non-drop-frame. The recorder must call FormatChangedFunc if there is any change.

recCapInfoRec

Selector: *recmod_QueryInfo*

Allows the recorder to supply the resolution and pixel aspect ratio of the clip being logged.

```
typedef struct {
     csSDK_int32    version;
     int            timeScale;
     int            sampleSize;
     csSDK_int32    vidSubType;
     int            width;
     int            height;
     int            depth;
     int            fieldType;
     int            quality;
     csSDK_int32    pixelAspectRatio;
     csSDK_int32    audSubType;
     int            audRate;
     int            audSampleSize;
     int            audStereo;
     int            reserved[10];
     char           *setup;
} recCapInfoRec;
```

version	The version of this structure. kRecCapInfoRecVersion
timeScale	Unused. A logged clip gets it's frame rate from the device controller in *cmdStatus*.
sampleSize	
vidSubType	Unused.
width	Video resolution
height	

`depth`	Unused.
`fieldType`	
`quality`	
`pixelAspectRatio`	Pixel aspect ratio. This uses a representation where the numerator is bit-shifted 16 to the left, and OR'd with the denominator. For example NTSC DV 0.9091 PAR is (10 << 16) | 11.
`audSubType`	Unused.
`audRate`	
`audSampleSize`	
`audStereo`	

recSceneDetectionParmsRec

Selectors: *recmod_StartSceneSearch*

Used for scene searching. searchingForward is provided as a hint as the state of the device, and the `reportSceneFunc` should be used to notify Premiere of a scene boundary.

```
typedef struct {
     void                *callbackID;
     ReportSceneFunc     reportSceneFunc;
     int                 searchingForward;
     int                 searchMode;
     short               isDropFrame;
     csSDK_int32         earliestTimecode;
     csSDK_int32         greatestTimecode;
} recSceneDetectionParmsRec;
```

`callbackID`	Required for `reportSceneFunc`
`reportSceneFunc`	Use this to report the scenes
`searchingForward`	True if the tape is playing forward
`searchMode`	Either `sceneSearch_FastScan` or `scene-Search_SlowScan`
`isDropFrame`	True if drop-frame, false otherwise
`earliestTimecode`	Only set for `sceneSearch_SlowScan`: in point for range to report scene edge
`greatestTimecode`	Only set for `sceneSearch_SlowScan`: out point for range to report scene edge

7

Export Controllers

Starting in Premiere Pro 5.0.2, an export controller can drive any exporter to generate a file in any format and perform custom post-processing operations. Developers wanting to integrate Premiere Pro with an asset management system will want to use this API instead.

An export controller adds its own custom menu item to the File > Export submenu. When the user chooses the menu item, the plug-in is called with a `TimelineID`, which represents the current sequence. Although details on the current sequence are not passed in, the export controller can use the Sequence Info Suite to query for various properties. The export controller can then optionally display any custom modal UI to allow the user to set any parameters for the export. This UI will need to be provided by the export controller.

The export controller should then call `ExportFile` in the Export Controller Suite, which takes the `TimelineID`, a path to an exporter preset, and a path for the output. This will tell Premiere Pro to handle the export, displaying progress. The call will return either a success value, an error, or that the user canceled. During the export, the UI will be blocked, just as when doing a standard export that doesn't use the Adobe Media Encoder Render Queue.

Once Premiere Pro completes the export, the call will return to the export controller. The plug-in can then perform any post-processing operations, such as transferring the newly exported file over the network, or registering the file in an asset management system.

8 Exporters

Exporters are used to export video, audio, and markers in any format. Exporters get individual video frames in a requested pixel format (generally, uncompressed video) and uncompressed audio. The exporter is responsible for any compression of the video and audio data, and wrapping the output in a file format. To reuse an existing exporter, you may provide an export controller.

Exporters can be used from within Premiere Pro, or from Adobe Media Encoder. From within Premiere Pro, go to the File > Export > Media dialog. From there, the Export Settings dialog appears. The format chosen in the Format drop-down determines the exporter used, and the exporter provides the parameter settings and summary displayed in the Export Settings dialog.

Exporters can optionally provide hardware acceleration by coordinating with a renderer plug-in to render timeline segments. Legacy editing modes are formed by the combination of an exporter and a player; the exporter generates preview files and the player manages the cutlist.

If you've never developed an exporter before, you can skip the What's New sections, and go directly to Getting Started.

What's New

What's New in CC

A new Captions tab has been added to the Export Settings, for Closed Captioning export. For all formats, a sidecar file containing the captions can be exported. To learn how exporters can optionally embed Closed Captioning directly in the output file, see the Closed Captioning section.

Two new selectors have been added to GetExportSourceInfo in the Export Info Suite. You can use `kExportInfo_UsePreviewFiles` to check if the user has checked "Use Previews" in the Export Settings dialog. If so, if possible, reuse any preview files already rendered. You can use `kExportInfo_NumAudioChannels` to get the number of audio channels in a given source.

This can be used to automatically initialize the audio channel parameter in the Audio tab of the Export Settings to match the source.

In the Export Param Suite, a new function, `MoveParam()`, can be used to move an existing parameter to a new location.

What's New in CS6

Exporters can now use the Exporter Utility Suite for "push" model compression. The exporter host can simply push frames to a thread-safe exporter-specified callback. This will cut down on the code previously required for render loop management. It should also yield substantial performance increases for exporters that haven't finely tuned their multithreaded rendering. The "pull" model is still supported, and required for Encore and legacy versions of Premiere Pro and Media Encoder.

The new Export Standard Param Suite provides the standard parameters used in many built-in exporters. This can greatly reduce the amount of code needed to manage standard parameters for a typical exporter, and guarantee consistency with built-in exporters.

Stereoscopic video is now supported when exporting directly from Premiere Pro. In other words, when exports are queued to run in Adobe Media Encoder, they can not get stereoscopic video. Note that currently stereoscopic exporters must use the "pull" model and the new `MakeVideoRendererForTimelineWithStreamLabel()` to get rendered frames from multiple video streams.

Export Param Suite now adds `SetParamDescription()`, to set tooltip strings for parameters. For the three line Export Summary description in the Export Settings dialog, we've swapped the 2nd and 3rd lines so that the bitrate summary comes after the audio summary. We've renamed the structure to make developers aware of this during a recompile.

Adobe Media Encoder now includes a Preset Browser that provides more organization for presets. Make sure your presets take advantage of this organization, and are shown in your desired proper location in the Preset Browser.

Exporters can now set events (error, warning, or info) for a specific encode in progress in the Adobe Media Encoder render queue. The existing call in the Error Suite is not sufficient for AME to relate the event to a specific encode. So the new Exporter Utility Suite provides a way for exporters running either in Premiere Pro or Adobe Media Encoder to log events. These events are displayed in the application UI, and are also added to the AME encoding log.

Multiple exporters are now supported in a single plug-in. To support this, `exExporterInfoRec` is now set to exporters on *exShutdown*.

exQueryOutputSettingsRec has a new member, outUseMaximumRenderPrecision, moving knowledge of this render parameter to the exporter.

What's New in CS5.5

A new call, RenderVideoFrameAndConformToPixelFormat, has been added to the Sequence Render Suite. This allows an exporter to request a rendered frame and then conform it to a specific pixel format.

A new return value, exportReturn_ParamButtonCancel, has been added to signify that an exporter is returning from *exSelParamButton* without modifying anything.

Export Controller API

We have opened up a new export controller API that can drive any exporter to generate a file in any format and perform custom post-processing operations. Developers wanting to integrate Premiere Pro with an asset management system will want to use this API instead.

What's New in CS5

exQueryOutputFileListAfterExportRec is now exQueryOutputFileListRec, with a slight change to the structure order.

We've also fixed a few bugs, such as bug 1925419, where all sliders would be given a checkbox to disable the control, as if exParamFlag_optional had been set.

We've made a couple new attributes available to exporters via the GetExportSourceInfo() call - the video poster frame time, and the source timecode.

3rd-party exporters can now be used to transcode assets to MPEG-2 or Blu-ray compliant files. Please refer to the Guidelines for Exporters in Encore for instructions on how to set up your exporter so that Encore can use it for transcoding.

Porting From the Compiler API

The export API replaces the old compiler API from CS3 and earlier versions. The export API combines the processing speed and quality of the old compiler API, with the UI flexibility of Media Encoder. Although the selectors and structures have been renamed and reorganized, much of the code that deals with rendering and writing frames is mostly the same.

The parameter UI is what has changed the most. Rather than having a standard set of parameters as standard compilers had, or having a completely custom UI as custom compilers had, in the new exporter API, all parameters must be explicitly added using the Export Param Suite. First register the parameters during *exSelGenerateDefaultParams*, and then provide the localized strings and constrained parameter values during *exSelPostProcessParams*. When the exporter is sent *exSelExport* to export, get the parameter values, again using the Export Param Suite.

Getting Started

Start your plug-in by modifying the SDK sample. Step through the code in your debugger to learn the order of events.

Media Encoder as a Test Harness

It may be faster to developing exporters using Media Encoder, since it is a lighter-weight application. However, you will want to test your exporter in Premiere Pro, to make sure the behavior is the same as when running in Media Encoder.

Adding Parameters

Starting in CS6, the Export Standard Param Suite provides a way to add several basic sets of parameters, whether for video, audio, still sequences, etc. Beyond the standard parameters, custom defined parameters can be added using the Export Param Suite.

First register the parameters during *exSelGenerateDefaultParams*. Then provide the localized strings and min/max parameter values during *exSelPostProcessParams*. When the exporter is sent *exSelExport* to export, get the user-specified parameter values using the Export Param Suite.

Updating Parameters Dynamically

Parameters can be updated dynamically based on user interaction with any related parameter. The time to update is during the *exSelValidateParamChanged* selector. Use ChangeParam in the Export Param Suite to make the change. Then, set `exParamChangedRec.rebuildAllParams` to true before returning. If you don't set that flag, parameters may appear out of order after a change.

Supporting "Match Source"

The exporter must set `exExporterInfoRec.canMatchSource` to true. This will add the Match Source button to the Video tab in the Export Settings.

Next, if the Match Source button is pressed in the Export Settings, `exPostProcessParams-Rec.doConformToMatchParams` will be true. The exporter should respond by updating any parameter values it can to match the source settings.

Get Video Frames and Audio Samples

Starting in CS6, exporters can use the new push model, or the legacy pull model for obtaining frames. The new push model is supported starting in CS6, and the pull model is still supported. Developing for Encore and previous versions of Premiere Pro and Media Encoder requires using the pull model.

Push Model

Using the push model, the exporter host can simply push frames to a thread-safe exporter-specified callback. Use `DoMultiPassExportLoop` in the Exporter Utility Suite to register the callback.

Compared with the pull model, this will cut down on the code previously required for render loop management. It should also yield substantial performance increases for exporters that haven't finely tuned their multithreaded rendering.

Pull Model

Using the pull model to get video and audio data involves making calls to the host to ask for this data. Use the Sequence Render Suite to get individual video frames, and the Sequence Audio Suite to get buffers of audio samples.

Video frames can be requested synchronously or asynchronously. The asynchronous method can yield better performance, but it is up to the exporter to provide its asynchronous render loop.

Handling a Pause or Cancel by the User (Pull Model only)

Push model export does not require any special code to handle pause or cancel by the user. For pull model export, the way to check if the user has paused or cancelled the export is to call `UpdateProgressPercent` in the Export Progress Suite, and check the return value. If the return value is `suiteError_ExporterSuspended`, the user has hit the pause button, which is only available in the Media Encoder UI. If the return value is `exportReturn_Abort`, then the export has been cancelled by the user.

If `UpdateProgressPercent` returns `suiteError_ExporterSuspended`, then the exporter should next call `WaitForResume`, which will block until the user has unpaused the export.

If `UpdateProgressPercent` returns `exportReturn_Abort`, the exporter should take steps to abort the export and clean up. Note that the exporter can still continue to ask for video frames and audio samples after a cancel has been received, which is useful in certain circumstances, such as if an exporter needs a few more frames to complete an MPEG GOP, or if it wants to include the audio for the video exported up to the point of cancel. This allows the exporter to generate well-formed output files, even in the case of a cancel.

Creating Presets

Create your own presets using the Export Settings UI, either from within Premiere Pro, or Media Encoder. Just modify the parameters the way you want, and hit the Save icon to save the preset to disk. The presets are saved with the extension '.epr'.

Starting in CS5, all the presets are saved to the same location, regardless of whether saved from Premiere Pro or Media Encoder:

On Windows 7, presets are saved here:
`[User folder]\AppData\Roaming\Adobe\Common\AME\[version]\Presets\`

On Mac OS:
`~/Library/Preferences/Adobe/Common/AME/[version]/Presets/`

In CS4, where the files are saved depends on whether you've opened the Export Settings UI in Premiere Pro or Media Encoder:

Media Encoder presets
On Windows Vista, presets are saved here:
`[User folder]\AppData\Roaming\Adobe\Adobe Media Encoder\[version]\Presets\`
On Windows XP:
`[Documents and Settings folder]\[user name]\Application Data\Adobe\Adobe Media Encoder\[version]\Presets\`
On Mac OS:
`~/Library/Preferences/Adobe/Adobe Media Encoder/[version]/Presets/`

Premiere Pro presets
On Windows Vista, presets are saved here:
`[User folder]\AppData\Roaming\Adobe\Premiere Pro\[version]\Presets\`
On Windows XP:
`[Documents and Settings folder]\[user name]\Application Data\Adobe\Premiere Pro\[version]\Presets\`

On Mac OS:
`~/Library/Preferences/Adobe/Adobe Premiere Pro/[version]/Presets/`

AME Preset Browser

Starting in CS6, Adobe Media Encoder has a Preset Browser with provides a structured organization of presets. Third-party presets can be added to any folder or subfolder within the main categories. Once you have created a preset, it will default to the Other folder. You can set the desired folder location in the `<FolderDisplayPath>` tag in the preset XML. For example, if you set it to:

```
<FolderDisplayPath>System Presets/Image Sequence/PNG</
FolderDisplayPath>
```

then AME will display the preset in the System Presets > Image Sequence > PNG folder. It is essential to use: "System Presets/xxx/" where the xxx must be any of the existing main categories (use the English name for this). Only one level below can you can create a custom-named folder. If the folder doesn't already exist, it will be created.

The Preset Browser data is cached in a file at:
`[User Folder]\AppData\Roaming\Adobe\Common\AME\[version]\Presets\PresetTree.xml`
If you want to force a refresh of the Preset Browser data, just quit AME, delete this file, and relaunch AME.

Installation in CS4

For better performance, in CS4, we recommend you install any presets for your exporter in the application folder for Premiere Pro and Media Encoder. For both Windows and Mac OS:
`[App installation path]\MediaIO\systempresets\[exporter subfolder]`
The subfolder must be named based on the hexadecimal fourCCs of the `ClassID` and `filetype` of the exporter. For example, the SDK exporter has a `ClassID` of `'DTEK'` or `0x4454454B`, and a filetype of `'SDK_'` or `0x53444B5F`. So the subfolder must be named `'4454454B_53444B5F'`. For convenience, you can find the `ClassID` and `filetype` fourCCs in the preset file itself, in a decimal representation.

Parameter Caching

During development, when you modify parameters in your exporter and reload the plug-in into the host, the Settings UI may continue to show stale parameter data. New parameters that you have added may not appear, or old ones may continue to appear. Or if you have changed the UI for an existing parameter, it may not take effect.

At a minimum, any old presets must be deleted. This includes Media Encoder presets and Premiere Pro presets. After deleting the old presets, there are two options, depending on whether the an older version of the exporter has already been distributed and is in use.

Increment the Parameter Version

If an older version of the exporter is already being used by customers, you'll need to use parameter versioning. During *exSelGenerateDefaultParams*, you should call `SetParamsVersion()` in the Export Param Suite and increment the version number.

After that, create new presets and sequence encoder presets (if needed) using the new set of parameters. Make sure your installer removes the old presets, and installs the new ones.

Flush the Parameter Cache

If you don't increment the parameter version, you can manually flush the parameter cache in a few steps. After you've deleted the old presets, do the following:

1) Delete hidden presets that were created by the hosts for the most recently used parameter settings. Look for a file called `Placeholder Preset.epr` in both the folders above the Media Encoder presets and the Premiere Pro presets.
2) Delete `batch.xml`, used by Media Encoder. This is also in the folder above the Media Encoder presets. Deleting this is equivalent to deleting the items out of the Media Encoder render queue.
3) Delete Premiere Pro sequence encoder presets that use the exporter, if any
4) Even after deleting all the old presets, Media Encoder may initially show old cached parameter UI. In the Settings UI, just switch to a different format and then back to yours.

Multichannel Audio Layouts

To support multichannel audio layouts, `kPrAudioChannelType_MaxChannel` should be the type requested in `MakeAudioRenderer()`. The audio buffers you use for `GetAudio()` should likewise be an array of `kPrAudioChannelType_MaxChannel` channels, and yes, this means you may be allocating more space than actually used.

In the exporter's Audio tab UI, you can provide a parameter to choose between various multichannel audio layouts. You can compare your settings to what we have with the built-in formats, QuickTime and MXF (such as MXF OP1a and DNxHD). From the user selection in your audio export settings (e.g., 2x stereo, etc), you will know how many of those channels passed back in `GetAudio()` should actually be written to the file.

Here's a helpful video on audio track mapping:

https://www.video2brain.com/en/lessons/changes-in-audio-tracks-and-merged-clip-audio

Closed Captioning

Starting in CC, the Export Settings includes a new Captions tab, for Closed Captioning export. For all formats, a sidecar file containing the captions can be exported. Additionally, exporters can optionally embed Closed Captioning directly in the output file. First, the exporter must set `exExporterInfoRec.canEmbedCaptions` to true. This will add the option to embed the captions in the output file, from the Export Options drop-down in the Captions tab. If this option is selected during export, `exDoExportRec.embedCaptions` will be true. The exporter should retrieve the captions using the Captioning Suite.

Multiple File Formats

To support more than one file format in a single exporter, describe one format at a time during *exSelStartup*. After describing the first one, return `exportReturn_IterateExporter` from *exSelStartup*, and the exporter will be called again to describe the second format, and so on. After describing the last format, return `exportReturn_IterateExporter`, and the exporter will be called yet again. This time, return `exportReturn_IterateExporterDone`.

Use a unique `fileType` for each format. When you are later sent *exSelGenerateDefaultParams*, *exSelPostProcessParams*, etc, you'll want to pay attention to the `fileType`, and respond according to the format.

Exporters Used for Editing Modes

An exporter that is used in an editing mode must have a codec parameter, and that parameter ID must be `ADBEVideoCodec`. If Premiere Pro cannot find this parameter, it will not be able to reopen projects in the custom editing mode, and will revert the project to Desktop mode.

Sequence Encoder Presets

Sequence preview presets are now required for editing modes. These contain the exporter parameters to generate preview files. This makes preview file formats much easier to define, by using the Media Encoder or Premiere Pro UI to create presets, rather than directly editing XML.

To create a sequence encoder preset:
1) Create a preset. The name that you give it will be the name that will be used in the Sequence Settings > General > Preview File Format drop-down.
2) Make sure this preset is installed in the application folder for Premiere Pro, along with the other sequence presets:

On Windows, they should be installed here:
[App installation path]\Settings\EncoderPresets\SequencePreview\[editing mode GUID]*.epr
On MacOS, it is basically the same (inside the application package):
[App installation path]/[Premiere Pro package]/Contents/Settings/EncoderPresets/SequencePreview/[editing mode GUID]/*.epr

As you can see by the installation paths above, Premiere Pro associates the sequence preview presets with the editing mode they go with, by using the presets in the folder that matches the GUID of the editing mode. The editing mode GUID is defined in the editing mode XML file, using the `<EditingMode.ID>` tag.

Adding new Preview File Formats to Existing Editing Modes

You can not only provide sequence preview presets for your own editing mode, but you could even add additional sequence preview presets for one of the built-in editing modes. Editing mode GUIDs for built-in editing modes can be found in the `Adobe Editing Modes.xml` file. For example, the Desktop editing mode on Windows has the GUID `9678AF98-A7B7-4bdb-B477-7AC9C8DF4A4E`. On Mac OS it is `795454D9-D3C2-429d-9474-923AB13B7018`.

You can additionally restrict the list and specify which one is chosen by default, by editing the `<PresetComments>` tag in the preset file.
If the value of the tag starts with "IsConstrained,", then a comma delimited list of 4ccs follows that dictates which codecs are available, and the first one is chosen by default. For example, QuickTime DV NTSC.epr for the Mac DV NTSC editing mode has this:
`<PresetComments>IsConstrained,dvc </PresetComments>`
Which restricts the codec selection of the exporter to be only the single codec choice.

Stereoscopic Video

Note that currently stereoscopic exporters must use the old "pull" model, and only receive stereoscopic video when exporting directly from Premiere Pro. In other words, when exports are queued to run in Adobe Media Encoder, they will not get stereoscopic video.

To get rendered frames for both left and right eye, use the Video Segment Suite to request the left and right cutlists, and render frames from both. An exporter can tell if segments in both of them are identical (implying that they have nothing stereoscopic about them) by looking at the segment hashes, and you can tell if two frames are identical (by looking at the request identifiers).

Timeline Segments in Exporters

The timeline segments available to exporters do not always fully describe the sequence being exported. To consistently get timeline segments that fully describe the sequence, an exporter needs to work along with a renderer plug-in.

During a sequence export, Premiere Pro makes a copy of the project file and passes it to Media Encoder. Media Encoder takes that project and uses the PProHeadless process to generate rendered frames. So when an exporter, which is running in Media Encoder, parses the sequence, it only has a very high-level view. It sees the entire sequence as a single clip, and sees any optional cropping or filters as applied effects. So when parsing that simple, high-level sequence, if there are no effects, an exporter can just use the `MediaNode`'s `ClipID` with the Clip Render Suite to get frames directly from the PProHeadless process. In the PProHeadless process, a renderer plug-in can step in, parse the real sequence in all its glory, and optionally provide frames in a custom pixel format.

When rendering preview files, Premiere Pro does the rendering without Media Encoder, so an exporter can get the individual segments for each clip, similar to before.

Smart Rendering

Under very specific circumstances, an exporter can request compressed frames, avoiding unnecessary de/recompression. This would be done by providing both exporter and renderer plug-ins that parse timeline segments. If the source can be copied over to the destination, the compressed frames can be passed in a custom pixel format. These compressed frames are not guaranteed, however, so the exporter should be prepared to handle uncompressed frames.

Entry Point

```
DllExport PREMPLUGENTRY xSDKExport (
     csSDK_int32          selector,
     exportStdParms*      stdParmsP,
     void*                param1,
     void*                param2)
```

selector is the action the host wants the exporter to perform. `stdParms` provides callbacks to obtain additional information from the host or to have the host perform tasks. Parameters 1 and 2 vary with the selector; they may contain a specific value or a pointer to a structure. Return `exportReturn_ErrNone` if successful, or an appropriate return code.

Standard Parameters

A pointer to this structure is sent from the host to the plug-in with every selector.

```
typedef struct {
     csSDK_int32              interfaceVer;
     plugGetSPBasicSuiteFunc* getSPBasicSuite;
} exportStdParms;
```

Member	Description
`interfaceVer`	Exporter API version Premiere Pro CC - `prExportVersion400` Premiere Pro CS6 - `prExportVersion300` Premiere Pro CS5.5 - `prExportVersion250` Premiere Pro CS5 - `prExportVersion200` Premiere Pro 4.0.1 through 4.2.1 - `prExportVersion101` Premiere Pro CS4 - `prExportVersion100`
`getSPBasicSuite`	This very important call returns the SweetPea suite that allows plug-ins to acquire and release all other SweetPea suites. `SPBasicSuite* getSPBasicSuite();`

Selector Table

This table summarizes the various selector commands an exporter can receive.

Selector	param1	param2
exSelStartup	`exExporterInfoRec*`	unused
exSelBeginInstance	`exExporterInstanceRec*`	unused
exSelGenerateDefaultParams	`exGenerateDefaultParamRec*`	unused
exSelPostProcessParams	`exPostProcessParamsRec*`	unused
exSelValidateParamChanged	`exParamChangedRec*`	unused
exSelGetParamSummary	`exParamSummaryRec*`	unused
exSelParamButton	`exParamButtonRec*`	unused
exSelExport	`exDoExportRec*`	unused
exSelQueryExportFileExtension	`exQueryExportFileExtensionRec*`	unused
exSelQueryOutputFileList	`exQueryOutputFileList*`	unused
exSelQueryStillSequence	`exQueryStillSequenceRec*`	unused
exSelQueryOutputSettings	`exQueryOutputSettingsRec*`	unused
exSelValidateOutputSettings	`exValidateOutputSettingsRec*`	unused

exSelEndInstance	`exExporterInstanceRec*`	unused
exSelShutdown	`exExporterInfoRec*`	unused

Selector Descriptions

This section provides a brief overview of each selector and highlights implementation issues. Additional implementation details are at the end of the chapter.

exSelStartup

```
param1 - exExporterInfoRec *
param2 - unused
```

Sent during application launch, unless the exporter has been cached. A single exporter can support multiple codecs and file extensions. `exExporterInfoRec` describes the exporter's attributes, such as the format display name.

exSelBeginInstance

```
param1 - exExporterInstanceRec *
param2 - unused
```

Allocate any private data.

exSelGenerateDefaultParams

```
param1 - exGenerateDefaultParamRec *
param2 - unused
```

Set the exporter's default parameters using the Export Param Suite.

exSelPostProcessParams

```
param1 - exPostProcessParamsRec *
param2 - unused
```

Post process parameters. This is where the localized strings for the parameter UI must be provided.

exSelValidateParamChanged

```
param1 - exParamChangedRec *
param2 - unused
```

Validate any parameters that have changed. Based on a change to a parameter value, the exporter may update other parameter values, or show/hide certain parameter controls, using the Export Param Suite. To notify the host that the plug-in is changing other parameters, set `exParamChangedRec.rebuildAllParams` to a non-zero value.

exSelGetParamSummary

```
param1 - exParamSummaryRec *
param2 - unused
```

Provide a text summary of the current parameter settings, which will be displayed in the summary area of the Export Settings dialog.

exSelParamButton

```
param1 - exParamButtonRec *
param2 - unused
```

Sent if exporter has one or more buttons in its parameter UI, and the user clicks one of the buttons in the Export Settings. The ID of the button pressed is passed in `exParamButtonRec.buttonParamIdentifier`. Display any dialog using platform-specific UI, collect any user input, and save any changes back to `privateData`. If the user cancels the dialog, return `exportReturn_ParamButtonCancel` to signify that nothing in the `privateData` has changed.

exSelExport

```
param1 - exDoExportRec *
param2 - unused
```

Do the export! Sent when the user starts an export to the format supported by the exporter, or if the exporter is used in an Editing Mode and the user renders the work area.

Single file exporters are sent this selector only once per export (e.g. AVI, QuickTime). To create a single file, setup a loop where you request each frame in the `startTime` to `endTime` range using one of the render calls in the Sequence Render Suite and `GetAudio` in the Sequence Audio Suite. For better performance, you can use the asynchronous calls in the Sequence Render Suite to have the host render multiple frames on multiple threads.

Still frame exporters are sent *exSelExport* for each frame in the sequence (e.g. numbered TIFFs). The host will name the files appropriately.

Save render time by checking to see if frames are repeated. Inspect the `SequenceRender_GetFrameReturnRec.repeatCount` returned from a render call, which holds a frame repeat count.

exSelQueryExportFileExtension

```
param1 - exQueryExportFileExtensionRec *
param2 - unused
```

For exporters that support more than one file extension, specify an extension given the file type. If this selector is not supported by the exporter, the extension is specified by the exporter in `exExporterInfoRec.fileTypeDefaultExtension`.

exSelQueryOutputFileList

```
param1 - exQueryOutputFileListRec *
param2 - unused
```

For exporters that export to more than one file. This is called before an export for the host to find out which files would need to be overwritten. It is called after an export so the host will know about all the files created, for any post encoding tasks, such as FTP. If this selector is not supported by the exporter, the host application will only know about the original path.

This selector will be called three times. On the first call, the plug-in fills out `numOutputFiles`. The host will then make `numOutputFiles` count of `outputFileRecs`, but empty. On the second call, the plug-in fills out the path length (incl trailing null) for each `exOutputFileRec` element in `outputFileRecs`. The host will then allocate all paths in each `outputFileRec`. On the third call, the plug-in fills in the path members of the `outputFileRecs`.

exSelQueryStillSequence

```
param1 - exQueryStillSequenceRec *
param2 - unused
```

The host application asks a still-only exporter if it wants to export as a sequence, and at what frame rate.

exSelQueryOutputSettings

```
param1 - exQueryOutputSettingsRec *
param2 - unused
```

The host application asks the exporter for general details about the current settings. This is a required selector.

exSelValidateOutputSettings

```
param1 - exValidateOutputSettingsRec *
param2 - unused
```

The host application asks the exporter if it can export with the current settings. The exporter should return `exportReturn_ErrLastErrorSet` if not, and the error string should be set to a description of the failure.

exSelEndInstance

```
param1 - exExporterInstanceRec *
param2 - unused
```

Deallocate any private data.

exSelShutdown

```
param1 - unused
param2 - unused
```

Sent immediately before shutdown. Free all remaining memory and close any open file handles.

Return Codes

Return Code	Reason
`exportReturn_ErrNone`	Operation has completed without error.
`exportReturn_Abort`	User aborted the export.
`exportReturn_Done`	Export finished normally.
`exportReturn_InternalError`	Return this if none of the other errors apply.
`exportReturn_OutOfDiskSpace`	Out of disk space error.
`exportReturn_BufferFull`	The offset into the buffer would overflow it.

`exportReturn_ErrOther`	The vaguer the better, right?
`exportReturn_ErrMemory`	Out of memory.
`exportReturn_ErrFileNotFound`	File not found.
`exportReturn_ErrTooManyOpenFiles`	Too many open files.
`exportReturn_ErrPermErr`	Permission violation.
`exportReturn_ErrOpenErr`	Unable to open the file.
`exportReturn_ErrInvalidDrive`	Invalid drive.
`exportReturn_ErrDupFile`	Duplicate filename.
`exportReturn_ErrIo`	File I/O error.
`exportReturn_ErrInUse`	File is in use.
`exportReturn_IterateExporter`	Return value from *exSelStartup* to request exporter iteration.
`exportReturn_IterateExporterDone`	Return value from *exSelStartup* to indicate there are no more exporters.
`exportReturn_InternalErrorSilent`	Return error code from *exSelExport* to put a custom error message on screen just before returning control to the host.
`exportReturn_ErrCodecBadInput`	A video codec refused the input format.
`exportReturn_ErrLastErrorSet`	The exporter is returning an error using the Error Suite.
`exportReturn_ErrLastWarningSet`	The exporter is returning a warning using the Error Suite.
`exportReturn_ErrLastInfoSet`	The exporter is returning information using the Error Suite.
`exportReturn_ErrExceedsMaxFormatDuration`	The exporter (or the host) has deemed the duration of the export to be too large.
`exportReturn_VideoCodecNeedsActivation`	The current video codec is not activated and cannot be used.
`exportReturn_AudioCodecNeedsActivation`	The current audio codec is not activated and cannot be used.
`exportReturn_IncompatibleAudioChannelType`	The requested audio channels are not compatible with the source audio.
`exportReturn_IncompatibleVideoCodec`	New in CS5. User tried to load a preset with an invalid video codec
`exportReturn_IncompatibleAudioCodec`	New in CS5. User tried to load a preset with an invalid audio codec
`exportReturn_ParamButtonCancel`	New in CS5.5. Return this from *exSelParamButton* if the user cancelled settings dialog by pressing cancel button.

exportReturn_Unsupported	Unsupported selector.

Structures

Structure	Sent with selector
exDoExportRec	*exSelExport*
exExporterInfoRec	*exSelStartup*
exExporterInstanceRec	*exSelBeginInstance* and *exSelEndInstance*
exGenerateDefaultParamRec	*exSelGenerateDefaultParams*
exParamButtonRec	*exSelParamButton*
exParamChangedRec	*exSelValidateParamChanged*
exParamSummaryRec	*exSelGetParamSummary*
exPostProcessParamsRec	*exSelPostProcessParams*
exQueryExportFileExtensionRec	*exSelQueryExportFileExtension*
exQueryOutputFileListRec	*exSelQueryOutputFileList*
exQueryOutputSettingsRec	*exSelQueryOutputSettings*
exQueryStillSequenceRec	*exSelQueryStillSequence*
exValidateOutputSettingsRec	*exSelValidateOutputSettings*

Structure Descriptions

exDoExportRec

Selector: *exSelExport*

Provides general export settings. The exporter should retrieve the parameter settings from the Export Param Suite.

```
typedef struct {
     csSDK_uint32        exporterPluginID;
     void*               privateData;
     csSDK_uint32        fileType;
     csSDK_int32         exportAudio;
     csSDK_int32         exportVideo;
     PrTime              startTime;
     PrTime              endTime;
     csSDK_uint32        fileObject;
     PrTimelineID        timelineData;
     csSDK_int32          reserveMetaDataSpace;
     csSDK_int32          maximumRenderQuality;
     csSDK_int32          embedCaptions
} exDoExportRec;
```

`exporterPluginID`	The host's internal identifier for this exporter, used for various suite calls, such as in the Sequence Render Suite and Sequence Audio Suite.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*. Indicates which format the exporter should write, since exporters can support multiple formats.
`exportAudio`	If non-zero, export audio.
`exportVideo`	If non-zero, export video.
`startTime`	The start time of the sequence to export.
`endTime`	The end time of the sequence to export. If `startTime` is 0, also the total durection to export. Range specified is [`startTime, endTime`), meaning the `endTime` is not actually included in the range.
`fileObject`	For use with the Export File Suite, to get and manipulate the file specified by the user.
`timelineData`	Handle used for the Timeline Functions.
`reserveMetaDataSpace`	Amount to reserve in a file for metadata storage.
`maximumRenderQuality`	If non-zero, the exporter should set `SequenceRender ParamsRec.inRenderQuality` and `inDeinterlaceQuality` to `kPrRenderQuality_Max`.
`embedCaptions`	New in CC. If non-zero, the exporter should embed captions obtained from the Captioning Suite.

exExporterInfoRec

Selector: *exSelStartup* and *exSelShutdown* (starting in CS6)

Describe the exporter's capabilities by filling out this structure during *exSelStartup*. For each `filetype`, populate `exExporterInfoRec` and return `exportReturn_IterateExporter`. *exSelStartup* will then be resent. Repeat the process until there are no more file formats to describe, then return `exportReturn_IterateExporterDone`. The `fileType` indicates which format the exporter should currently work with in subsequent calls.

```
typedef struct {
     csSDK_uint32   unused;
```

```
    csSDK_uint32   fileType;
    prUTF16Char    fileTypeName[256];
    prUTF16Char    fileTypeDefaultExtension[256];
    csSDK_uint32   classID;
    csSDK_int32    exportReqIndex;
    csSDK_int32    wantsNoProgressBar;
    csSDK_int32    hideInUI;
    csSDK_int32    doesNotSupportAudioOnly;
    csSDK_int32    canExportVideo;
    csSDK_int32    canExportAudio;
    csSDK_int32    singleFrameOnly;
    csSDK_int32    maxAudiences;
    csSDK_int32    interfaceVersion;
    csSDK_uint32   isCacheable;
    csSDK_uint32   canConformToMatchParams;
    csSDK_uint32   canEmbedCaptions;
} exExporterInfoRec;
```

`fileType`	The file format four character code (e.g. `'AVIV'` = Video for Windows, `'MooV'` = QuickTime).
`fileTypeName`	The localized display name for the fileype.
`fileTypeDefaultExtension`	The default extension for the filetype. An exporter can support multiple extensions per filetype, by implementing *exSelQueryExportFileExtension*.
`classID`	Class identifier for the module, differentiates between exporters that support the same filetype and creates associations between different Media Abstraction Layer plug-ins.
`exportReqIndex`	If an exporter supports multiple filetypes, this index will be incremented by the host for each call, as the exporter is requested to describe its capabilities for each filetype. Initially zero, incremented by the host each time the exporter returns `exportReturn_IterateExporter`.
`wantsNoProgressBar`	If non-zero, the default exporter progress dialog will be turned off, allowing the exporter to display its own progress dialog. The exporter also will not get `exportReturn_Abort` errors from the host during callbacks – it must detect an abort on its own, and return `exportReturn_Abort` from *exSelExport* if the user aborts the export.
`hideInUI`	Set this to non-zero if this filetype should only be used for making preview files, and should not be visible as a general export choice.
`doesNotSupportAudioOnly`	Set this to non-zero for filetypes that do not support audio-only exports.

`canExportVideo`	Set this to non-zero if the exporter can output video.
`canExportAudio`	Set this to non-zero if the exporter can output audio.
`singleFrameOnly`	Set this to non-zero if the exporter makes single frames (used by still image exporters).
`maxAudiences`	
`interfaceVersion`	Exporter API version that the plug-in supports.
`isCacheable`	New in CS5. Set this non-zero to have Premiere Pro cache this exporter.
`canConformToMatch-Params`	New in CC. Set this to non-zero if the exporter wants to support the Match Source button.
`canEmbedCaptions`	New in CC. Set this to non-zero if the exporter can embed Closed Captioning directly in the file.

exExporterInstanceRec

Selector: *exSelBeginInstance* and *exSelEndInstance*

Provides access to the `privateData` for the indicated `filetype`, so that the exporter can allocate `privateData` and pass it to the host, or deallocate it.

```
typedef struct {
     csSDK_uint32   exporterPluginID;
     csSDK_uint32   fileType;
     void*          privateData;
} exExporterInstanceRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.
`privateData`	Data allocated and managed by the exporter.

exGenerateDefaultParamRec

Selector: *exSelGenerateDefaultParams*

Provides access to the `privateData` for the indicated `filetype`, so that the exporter can generate the default parameter set.

```
typedef struct {
     csSDK_uint32   exporterPluginID;
     void*          privateData;
     csSDK_uint32   fileType;
} exExporterInstanceRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.

exParamButtonRec

Selector: *exSelParamButton*

Provides access to the `privateData` for the indicated `filetype`, and discloses the specific button hit by the user, since there can be multiple button parameters.

```
typedef struct {
     csSDK_uint32          exporterPluginID;
     void*                 privateData;
     csSDK_uint32          fileType;
     csSDK_int32           exportAudio;
     csSDK_int32           exportVideo;
     csSDK_int32           multiGroupIndex;
     exParamIdentifier     buttonParamIdentifier;
} exParamButtonRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.
`exportAudio`	If non-zero, the current settings are set to export audio.
`exportVideo`	If non-zero, the current settings are set to export video.
`multiGroupIndex`	Discloses the index of the multi-group, containing the button hit by the user.
`buttonParamIdentifier`	Discloses the parameter ID of the button hit by the user.

exParamChangedRec

Selector: *exSelValidateParamChanged*

Provides access to the `privateData` for the indicated `filetype`, and discloses the specific parameter changed by the user. To notify the host that the plug-in is changing other parameters, set `rebuildAllParams` to a non-zero value.

```
typedef struct {
     csSDK_uint32        exporterPluginID;
     void*               privateData;
     csSDK_uint32        fileType;
     csSDK_int32         exportAudio;
     csSDK_int32         exportVideo;
     csSDK_int32         multiGroupIndex;
     exParamIdentifier   changedParamIdentifier;
     csSDK_int32         rebuildAllParams;
} exParamChangedRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.
`exportAudio`	If non-zero, the current settings are set to export audio.
`exportVideo`	If non-zero, the current settings are set to export video.
`multiGroupIndex`	Discloses the index of the multi-group, containing the parameter changed by the user.
`changedParamIdentifier`	Discloses the parameter ID of the parameter changed by the user. May be empty if the changed item was `exportAudio`, `exportVideo` or the current `multiGroupIndex`.
`rebuildAllParams`	Set this to non-zero to tell the host to refresh ALL parameters using the latest provided information. This can solve various problems when dynamically updating parameter visibility, valid ranges, etc.

exParamSummaryRec

Selector: *exSelGetParamSummary*

Provides access to the `privateData` for the indicated `filetype`, and provides buffers for the exporter to fill in with a localized summary of the parameters.

```
typedef struct {
     csSDK_uint32   exporterPluginID;
     void*          privateData;
     csSDK_int32    exportAudio;
     csSDK_int32    exportVideo;
     prUTF16Char    videoSummary[256];
     prUTF16Char    audioSummary[256];
     prUTF16Char    bitrateSummary[256];
} exParamSummaryRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`exportAudio`	If non-zero, the current settings are set to export audio.
`exportVideo`	If non-zero, the current settings are set to export video.
`videoSummary`	Fill these in with a line of a localized summary of the parameters.
`audioSummary`	
`bitrateSummary`	

exPostProcessParamsRec

Selector: *exSelPostProcessParams*

Provides access to the `privateData` for the indicated `filetype`.

```
typedef struct {
     csSDK_uint32         exporterPluginID;
     void*                privateData;
     csSDK_uint32         fileType;
     csSDK_int32          exportAudio;
     csSDK_int32          exportVideo;
     csSDK_int32          doConformToMatchParams;
} exPostProcessParamsRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.
`exportAudio`	If non-zero, the current settings are set to export audio.
`exportVideo`	If non-zero, the current settings are set to export video.
`doConformToMatch-Params`	New in CC.

exQueryExportFileExtensionRec

Selector: *exSelQueryExportFileExtension*

Provides access to the `privateData` for the indicated `filetype`, and provides a buffer for the exporter to fill in with the file extension.

```
typedef struct {
    csSDK_uint32        exporterPluginID;
    void*               privateData;
    csSDK_uint32        fileType;
    prUTF16Char         outFileExtension[256];
} exQueryExportFileExtensionRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.
`outFileExtension`	Provide the file extension here, given the current parameter settings.

exQueryOutputFileListRec

Selector: *exSelQueryOutputFileList*

Provides access to the `privateData` for the indicated `filetype`, and provides a pointer to a array of `exOutputFileRecs` for the exporter to fill in with the file paths.

```
typedef struct {
    csSDK_uint32        exporterPluginID;
    void*               privateData;
    csSDK_uint32        fileType;
    csSDK_uint32        numOutputFiles;
    PrSDKString         path;
    exOutputFileRec     *outputFileRecs;
} exQueryOutputFileListRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.
`numOutputFiles`	On the first call to *exSelQueryOutputFileList*, provide the number of file paths here.
`path`	New in CS5. Contains the primary intended destination path provided by the host.

`outputFileRecs`	An array of `exOutputFileRecs`. On the second call to *exSelQueryOutputFileList*, the path length (including trailing null) for each path. On the third call, fill in the path of each `exOutputFileRec`.
	
	`typedef struct`
	`{`
	`     int              pathLength;`
	`     prUTF16Char*     path;`
	`} exOutputFileRec;`

exQueryOutputSettingsRec

Selector: *exSelQueryOutputSettings*

Provides access to the `privateData` for the indicated `filetype`, and provides a set of members for the exporter to fill in with the current export settings.

```
typedef struct {
     csSDK_uint32         exporterPluginID;
     void*                privateData;
     csSDK_uint32         fileType;
     csSDK_int32          inMultiGroupIndex;
     csSDK_int32          inExportVideo;
     csSDK_int32          inExportAudio;
     csSDK_int32          outVideoWidth;
     csSDK_int32          outVideoHeight;
     PrTime               outVideoFrameRate;
     csSDK_int32          outVideoAspectNum;
     csSDK_int32          outVideoAspectDen;
     csSDK_int32          outVideoFieldType;
     double               outAudioSampleRate;
     PrAudioSampleType    outAudioSampleType;
     PrAudioChannelType   outAudioChannelType;
     csSDK_uint32         outBitratePerSecond;
     csSDK_int32          outUseMaximumRenderPrecision;
} exQueryOutputSettingsRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.

`inMultiGroupIndex`	Return the parameter settings of the multi-group with this index.
`inExportVideo`	If non-zero, the current settings are set to export video.
`inExportAudio`	If non-zero, the current settings are set to export audio.

`outVideoWidth`
`outVideoHeight`
`...`
	Return each parameter setting, by getting the current value of the parameter using the Export Param Suite. Some settings, such as `outVideoFieldType`, may be implicit, for example if the format only supports progressive frames.

`outUseMaximumRender-Precision`	New in CS6. If non-zero, renders will always be made at maximum bit-depth.

exQueryStillSequenceRec

Selector: *exSelQueryStillSequence*

Provides access to the `privateData` for the indicated `filetype`, and provides a set of members for the exporter to provide information on how it would export the sequence of stills.

```
typedef struct {
     csSDK_uint32   exporterPluginID;
     void*          privateData;
     csSDK_uint32   fileType;
     csSDK_int32    exportAsStillSequence;
     PrTime         exportFrameRate;
} exQueryStillSequenceRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.
`exportAsStillSequence`	Set this to non-zero to tell the host that the exporter can export the stills as a sequence.
`exportFrameRate`	Set this to the frame rate of the still sequence.

exValidateOutputSettingsRec

Selector: *exSelValidateOutputSettings*

Provides access to the `privateData` for the indicated `filetype`, so that the exporter can validate the current parameter settings.

```
typedef struct {
    csSDK_uint32   exporterPluginID;
    void*          privateData;
    csSDK_uint32   fileType;
} exExporterInstanceRec;
```

`exporterPluginID`	The host's internal identifier for this exporter. Do not modify.
`privateData`	Data allocated and managed by the exporter.
`fileType`	The file format four character code set by the exporter during *exSelStartup*.

Suites

For information on how to acquire and manage suites, see the SweetPea Suites section.

Export File Suite

A cross-platform suite for writing to files on disk. Also provides a call to get the file path, given the file object. Version 2 resolves a mismatch in seek modes in version 1, where `fileSeekMode_End` was handled as `fileSeekMode_Current` and visa versa. See PrSDKExportFileSuite.h.

Export Info Suite

GetExportSourceInfo

Get information on the source currently being exported.

```
prSuiteError (*GetExportSourceInfo)(
     csSDK_uint32                 inExporterPluginID,
     PrExportSourceInfoSelector   inSelector,
     PrParam                      *outSourceInfo);
```

Value	Type	Description
`kExportInfo_VideoWidth`	`Int32`	Width of source video
`kExportInfo_VideoHeight`	`Int32`	Height of source video
`kExportInfo_VideoFrameRate`	`PrTime`	Frame rate
`kExportInfo_VideoFieldType`	`Int32`	One of the `prFieldType` values
`kExportInfo_VideoDuration`	`Int64`	A `PrTime` value

`kExportInfo_PixelAspectNumerator`	`Int32`	Pixel aspect ratio (PAR) numerator
`kExportInfo_PixelAspectDenominator`	`Int32`	Pixel aspect ratio denominator
`kExportInfo_AudioDuration`	`Int64`	A `PrTime` value
`kExportInfo_AudioChannelsType`	`Int32`	One of the PrAudioChannelType values. Returns 0 (which is undefined) if there's no audio.
`kExportInfo_AudioSampleRate`	`Float64`	
`kExportInfo_SourceHasAudio`	`Bool`	Non-zero if source has audio
`kExportInfo_SourceHasVideo`	`Bool`	Non-zero if source has video
`kExportInfo_RenderAsPreview`	`Bool`	Returns a non-zero value if currently rendering preview files.
`kExportInfo_SequenceGUID`	`Guid`	A `PrPluginID`, which is a unique GUID for the sequence.
`kExportInfo_SessionFilePath`	`PrMemoryPtr`	A `prUTF16Char` array. The exporter should release the pointer using the Memory Manager suite.
`kExportInfo_VideoPosterFrameTickTime`	`Int64`	New in CS5. A `PrTime` value.
`kExportInfo_SourceTimecode`	`PrMemoryPtr`	New in CS5.0.2. The timecode of the source clip or sequence. The sequence timecode is set by the Start Time of a sequence using the sequence wing-menu. A pointer to a `ExporterTimecodeRec` structure. The exporter should release the pointer using the Memory Manager Suite.
`kExportInfo_UsePreviewFiles`	`Bool`	New in CC. Use this to check if the user has checked "Use Previews" in the Export Settings dialog. If so, if possible, reuse any preview files already rendered, which can be retrieved using `AcquireVideoSegmentsWithPreviewsID` in the Video Segment Suite.

`kExportInfo_NumAudioChannels`	`Int32`	New in CC. Get the number of audio channels in a given source. This can be used to automatically initialize the audio channel parameter in the Audio tab of the Export Settings to match the source.

```
typedef struct
{
     csSDK_int64    mTimecodeTicks;
     csSDK_int64    mTicksPerFrame;
     bool           mTimecodeStartPrefersDropFrame;
} ExporterTimecodeRec;
```

Export Param Suite

Specify all parameters for your exporter UI. See PrSDKExportParamSuite.h. Also, see the SDK Export sample for a demonstration of how to use this suite.

To provide either a set of radio buttons or a drop-down list of choices, use `AddConstrainedValuePair()`. Adding two choices will result in a pair of radio buttons side-by-side. Three or more choices will be displayed as a drop-down box. Adding only one value will result in a hard-coded string.

In CS5, and later fixed in 5.0.2, there is an issue where width and height ranges aren't correctly set. You may notice this when adjusting the width and height in the Export Settings UI. By unclicking the chain that constrains width and height ratio, you will be able to modify the width and height. As a side-effect of this bug, if the exporter is used to render preview files in an Editing Mode, the user will be able to choose any preview frame size between 24x24 and 10240x8192.

CS6 adds `SetParamDescription()`, to set tooltip strings for parameters.

CC adds `MoveParam()`, to move an existing parameter to a new location. This can be used for both standard parameters and group parameters.

Export Progress Suite

For pull-model exporters. Report progress during the export. Also, handle the case where the user pauses or cancels an export. See PrSDKExportProgressSuite.h.

Export Standard Param Suite

New in CS6. A suite for registering one of several common parameter sets, reducing parameter management code on the plug-in side.

AddStandardParams

Register a set of standard parameters to be used by the exporter. Call during *exSelGenerateDefaultParams*.

```
prSuiteError (*AddStandardParams)(
     csSDK_uint32        inExporterID,
     PrSDKStdParamType   inSDKStdParamType);
```

Parameter	Description
`inExporterID`	Pass in `exporterPluginID` from `exDoExportRec`.

`inSDKStdParamType`	Use one of the following:
	
	`enum PrSDKStdParamType`
	`{`
	`     SDKStdParams_Video,`
	`     SDKStdParams_Audio,`
	`     SDKStdParams_Still,`
	`     SDKStdParams_VideoBitrateGroup,`
	`     SDKStdParams_Video_NoRenderMax,`
	`     SDKStdParams_Video_AddRenderMax,`
	`     SDKStdParams_AudioTabOnly,`
	`     SDKStdParams_AudioBitrateGroup,`
	`     SDKStdParams_VideoWithSizePopup`
	`};`

PostProcessParamNames

Call during *exSelPostProcessParams*.

```
prSuiteError (*PostProcessParamNames)(
     csSDK_uint32        inExporterID,
     PrAudioChannelType  inSourceAudioChannelType);
```

Parameter	Description
`inExporterID`	Pass in `exporterPluginID` from `exDoExportRec`.

inSourceAudio-ChannelType	Pass in the source audio channel type, which can be queried from GetExportSourceInfo in the Export Info Suite.

QueryOutputSettings

Call during *exSelQueryOutputSettings*.

```
prSuiteError (*QueryOutputSettings)(
     csSDK_uint32                  inExporterID,
     exQueryOutputSettingsRec*     outOutputSettings);
```

Parameter	Description
inExporterID	Pass in exporterPluginID from exDoExportRec.
outOutputSettings	This structure will be filled out based on the standard parameter settings.

MakeParamSummary

Call during *exSelGetParamSummary*.

```
prSuiteError (*MakeParamSummary)(
     csSDK_uint32        inExporterID,
     csSDK_int32         inDoVideo,
     csSDK_int32         inDoAudio,
     prUTF16Char*        outVideoDescription,
     prUTF16Char*        outAudioDescription);
```

Parameter	Description
inExporterID	Pass in exporterPluginID from exDoExportRec.
inDoVideo inDoAudio	Pass in exParamSummaryRec.exportVideo / exportAudio so that the summary will be set based on whether video / audio are being exported.
outVideoDescription outAudioDescription	These will be filled out based on the standard parameter settings.

Exporter Utility Suite

New in CS6. Provides functions for push-model exporters, and also provides a way to register an export event (error, warning, or info) to be displayed by the host and written to the log.

DoMultiPassExportLoop

Register the callback to be made to push video frames to the exporter. This function assumes that your exporter supports *exSelQueryOutputSettings*, which will be called.

```
prSuiteError (*DoMultiPassExportLoop)(
     csSDK_uint32                       inExporterID,
     const ExportLoopRenderParams *     inRenderParams,
     csSDK_uint32                       inNumberOfPasses,
     PrSDKMultipassExportLoopFrameCompletionFunction
                                        inCompletionFunction,
     void *    inCompletionParam);
```

Parameter	Description
`inExporterID`	Pass in `exporterPluginID` from `exDoExportRec`.

`inRenderParams`	Pass in the parameters that will be used for the render loop that will push rendered frames via the provided callback `inCompletionFunction`.
	
	`inReservedProgressPreRender` and `inReservedProgressPostRender` should be set to the amount of progress to be shown in any progress bar before starting the render loop, and how much is remaining after finishing the render loop. These values default to zero.
	
	`typedef struct`
	`{`
	`     csSDK_int32    inRenderParamsSize;`
	`     csSDK_int32`
	`          inRenderParamsVersion;`
	`     PrPixelFormat  inFinalPixelFormat;`
	`     PrTime         inStartTime;`
	`     PrTime         inEndTime;`
	`     float`
	`          inReservedProgressPreRender;`
	`     float`
	`          inReservedProgressPostRender;`
	`} ExportLoopRenderParams;`

`inNumberOfPasses`	Set to 1, unless you need multipass encoding such as two-pass or three-pass encoding.

`inCompletionFunction`	Provide your own callback here, which will be called when the host pushes rendered frames. Use the following function signature:
	
	`typedef prSuiteError`
	`(*PrSDKMultipassExportLoop`
	`FrameCompletionFunction)(`
	`csSDK_uint32   inWhichPass,`
	`csSDK_uint32   inFrameNumber,`
	`csSDK_uint32   inFrameRepeatCount,`
	`PPixHand       inRenderedFrame,`
	`void*          inCallbackData);`
	
	Currently, there is no simple way to ensure that pushed frames survive longer than the life of the function call. If you are interested in this capability, please contact us and explain your need.

`inCompletionParam`	Pass in a `void *` to the data you wish to send to your `inCompletionFunction` above in `inCallbackData`.

ReportIntermediateProgressForRepeatedVideoFrame

Register the callback to be made to push video frames to the exporter. This function assumes that your exporter supports *exSelQueryOutputSettings*, which will be called.

```
prSuiteError (*ReportIntermediateProgressForRepeatedVideoFrame)(
        csSDK_uint32   inExporterID,
        csSDK_uint32   inRepetitionsProcessedSinceLastUpdate);
```

Parameter	Description
`inExporterID`	Pass in `exporterPluginID` from `exDoExportRec`.
`inRepetitionsProcessedSinceLastUpdate`	Pass in the number of repeated frames processed since the last call was made, if any.

ReportEvent

Report an event to the host, for a specific encode in progress in the Adobe Media Encoder render queue or Premiere Pro. These events are displayed in the application UI, and are also added to the AME encoding log.

```
prSuiteError (*ReportEvent)(
     csSDK_uint32         inExporterID,
     csSDK_uint32         inEventType,
     const prUTF16Char*   inEventTitle,
     const prUTF16Char*   inEventDescription);
```

Parameter	Description
`inExporterID`	Pass in `exporterPluginID` from `exDoExportRec`.
`inEventType`	Use one of the types from the Error Suite: `kEventTypeInformational`, `kEventTypeWarning`, or `kEventTypeError`
`inEventTitle`	Provide information about the event for the user.
`inEventDescription`	

Palette Suite

A seldom-used suite for palettizing an image, for example, for GIFs. See PrSDKPaletteSuite.h.

Sequence Audio Suite

Get audio from the host.

MakeAudioRenderer

Create an audio renderer, in preparation to get rendered audio from the host.

```
prSuiteError (*MakeAudioRenderer)(
     csSDK_uint32         inPluginID,
     PrTime               inStartTime,
     PrAudioChannelType   inChannelType,
     PrAudioSampleType    inSampleType,
     float                inSampleRate,
     csSDK_uint32*        outAudioRenderID);
```

Parameter	Description
`inPluginID`	Pass in `exporterPluginID` from `exDoExportRec`.
`inStartTime`	Start time for the audio requests.
`inChannelType`	`PrAudioChannelType` enum value for the channel type needed.

`inSampleType`	This should always be `kPrAudioSampleType_32BitFloat`. Other types are unsupported.
`inSampleRate`	Samples per second.
`outAudioRenderID`	This ID passed back is needed for subsequent calls to this suite.

ReleaseAudioRenderer

Release the audio renderer when the exporter is done requesting audio.

```
prSuiteError (*ReleaseAudioRenderer)(
     csSDK_uint32   inPluginID,
     csSDK_uint32   inAudioRenderID);
```

Parameter	Description
`inPluginID`	Pass in `exporterPluginID` from `exDo-ExportRec`.
`inAudioRenderID`	The call will release the audio renderer with this ID.

GetAudio

Returns from the host the next contiguous requested number of audio sample frames, specified in `inFrameCount`, in `inBuffer` as arrays of uninterleaved floating point values. Returns `suiteError_NoError` if no error. The plug-in must manage the memory allocation of `inBuffer`, which must point to n buffers of floating point values of length `inFrameCount`, where n is the number of channels. When `inClipAudio` is non-zero, this parameter makes `GetAudio` clip the audio samples at +/- 1.0.

```
prSuiteError (*GetAudio)(
     csSDK_uint32   inAudioRenderID,
     csSDK_uint32   inFrameCount,
     float**        inBuffer,
     char           inClipAudio);
```

Parameter	Description
`inAudioRenderID`	Pass in the `outAudioRenderID` returned from `MakeAudioRenderer()`. This gives the host the context of the audio render.

`inFrameCount`	The number of audio frames to return in `inBuffer`. The next contiguous audio frames will always be returned, unless `ResetAudioToBeginning` has just been called.
`inBuffer`	An array of `float` arrays, allocated by the exporter. The host returns the samples for each audio channel in a separate array.
`inClipAudio`	When true, `GetAudio` will return audio clipped at +/- 1.0. Otherwise, it will return unclipped audio.

ResetAudioToBeginning

This call will reset the position on the audio generation to time zero. This can be used for multi-pass encoding.

```
prSuiteError (*ResetAudioToBeginning)(
     csSDK_uint32 inAudioRenderID);
```

GetMaxBlip

Returns the maximum number of audio sample frames that can be requested from one call to `GetAudio` in `maxBlipSize`.

```
prSuiteError (*GetMaxBlip)(
     csSDK_uint32   inAudioRenderID,
     PrTime    inTicksPerFrame,
     csSDK_uint32*  maxBlipSize);
```

Sequence Render Suite

Get rendered video from one of the renderers available to the host. This may use one of the host's built-in renderers, or a plug-in renderer, if available For best performance, use the asynchronous render requests with the source media prefetching calls, although synchronous rendering is available too.

Version 4, new in CS5.5, adds `RenderVideoFrameAndConformToPixelFormat`().

MakeVideoRenderer()

Create a video renderer, in preparation to get rendered video.

```
prSuiteError (*MakeVideoRenderer)(
     csSDK_uint32   pluginID,
     csSDK_uint32*  outVideoRenderID
     PrTime         inFrameRate);
```

Parameter	Description
`pluginID`	Pass in `exporterPluginID` from `exDoExportRec`.
`outVideoRenderID`	This ID passed back is needed for subsequent calls to this suite.
`inFrameRate`	Frame rate, in ticks.

ReleaseVideoRenderer()

Release the video renderer when the exporter is done requesting video.

```
prSuiteError (*ReleaseVideoRenderer)(
     csSDK_uint32   pluginID,
     csSDK_uint32   inVideoRenderID);
```

Parameter	Description
`pluginID`	Pass in `exporterPluginID` from `exDoExportRec`.
`inVideoRenderID`	The call will release the video renderer with this ID.

struct SequenceRender_ParamsRec

Fill this structure in before calling `RenderVideoFrame()`, `QueueAsyncVideoFrameRender()`, or `PrefetchMediaWithRenderParameters()`. Note that if the frame aspect ratio of the request does not match that of the sequence, the frame will be letterboxed or pillarboxed, rather than stretched to fit the frame.

```
typedef struct
{
     const PrPixelFormat*     inRequestedPixelFormatArray;
     csSDK_int32              inRequestedPixelFormatArrayCount;
     csSDK_int32              inWidth;
     csSDK_int32              inHeight;
     csSDK_int32              inPixelAspectRatioNumerator;
     csSDK_int32              inPixelAspectRatioDenominator;
     PrRenderQuality          inRenderQuality;
     prFieldType              inFieldType;
     csSDK_int32              inDeinterlace;
     PrRenderQuality          inDeinterlaceQuality;
     csSDK_int32              inCompositeOnBlack;
} SequenceRender_ParamsRec;
```

Member	Description
`inRequestedPixelFormatArray`	An array of PrPixelFormats that list your format preferences in order.
`inRequestedPixelFormatArray-Count`	Size of the pixel format array.
`inWidth`	Width to render at.
`inHeight`	Height to render at.
`inPixelAspectRatioNumerator`	Numerator of the pixel aspect ratio.
`inPixelAspectRatioDenominator`	Denominator of the pixel aspect ratio.
`inRenderQuality`	Use one of the `PrRenderQuality` enumerated values.
`inFieldType`	Use one of the `prFieldType` constants.
`inDeinterlace`	Set to non-zero, to force an explicit deinterlace. Otherwise, the renderer will use the output field setting to determine whether to automatically deinterlace any interlaced sources.
`inDeinterlaceQuality`	Use one of the `PrRenderQuality` enumerated values.
`inCompositeOnBlack`	Set to non-zero, to composite the render on black.

struct SequenceRender_GetFrameReturnRec

Returned from `RenderVideoFrame()` and passed by `PrSDKSequenceAsyncRenderCompletionProc()`.

```
typedef struct
{
     void*          asyncCompletionData;
     csSDK_int32    returnVal;
     csSDK_int32    repeatCount;
     csSDK_int32    onMarker;
     PPixHand       outFrame;
} SequenceRender_GetFrameReturnRec;
```

Member	Description
`asyncCompletionData`	Passed to `PrSDKSequenceAsyncRenderCompletionProc()` from `QueueAsyncVideoFrameRender()`. Not used by `RenderVideoFrame()`.
`returnVal`	`ErrNone`, `Abort`, `Done`, or an error code.
`repeatCount`	The number of repeated frames from this frame forward. In the output file, this could be writing NULL frames, changing the current frame's duration, or whatever is appropriate according to the codec.
`onMarker`	If non-zero, there is a marker on this frame.
`outFrame`	Returned from `RenderVideoFrame()`. Not returned from `PrSDKSequenceAsyncRenderCompletionProc()`

RenderVideoFrame()

The basic, synchronous call to get a rendered frame from the host. Returns `suiteError_NoError` if you can continue exporting, `exportReturn_Abort` if the user aborted the export, `exportReturn_Done` if the export has finished, or an error code.

```
prSuiteError (*RenderVideoFrame)(
     csSDK_uint32                        inVideoRenderID,
     PrTime                              inTime,
     SequenceRender_ParamsRec*           inRenderParams,
     PrRenderCacheType                   inCacheFlags,
     SequenceRender_GetFrameReturnRec*   getFrameReturn);
```

Parameter	Description
`inVideoRenderID`	Pass in the `outVideoRenderID` returned from `MakeVideoRenderer()`. This gives the host the context of the video render.
`inTime`	The frame time requested.
`inRenderParams`	The details of the render.
`inCacheFlags`	One or more cache flags.

`getFrameReturn`	Passes back a structure that contains info about the frame returned, and the rendered frame itself.

GetFrameInfo()

Gets information about a given frame. Currently, `SequenceRender_FrameInfoRec` only contains `repeatCount`, which is the number of repeated frames from this frame forward.

```
prSuiteError (*GetFrameInfo)(
     csSDK_uint32                 inVideoRenderID,
     PrTime                       inTime,
     SequenceRender_FrameInfoRec* outFrameInfo);
```

SetAsyncRenderCompletionProc()

Register a notification callback for getting asynchronously rendered frames when the render completes. `asyncGetFrameCallback` should have the signature described in `PrSDKSequenceAsyncRenderCompletionProc` below.

```
prSuiteError (*SetAsyncRenderCompletionProc)(
     csSDK_uint32                           inVideoRenderID,
     PrSDKSequenceAsyncRenderCompletionProc asyncGetFrameCallback,
     long                                   callbackRef);
```

Parameter	Description
`inVideoRenderID`	Pass in the `outVideoRenderID` returned from `MakeVideoRenderer()`. This will be passed to `PrSDKSequenceAsyncRenderCompletionProc`.
`asyncGetFrameCallback`	The notification callback.
`inCallbackRef`	A pointer holding data private to the exporter. This could be, for example, a pointer to an exporter instance. This will also be passed to `PrSDKSequenceAsyncRenderCompletionProc`.

PrSDKSequenceAsyncRenderCompletionProc()

Use this function signature for your callback used for async frame notification, passed to `SetAsyncRenderCompletionProc`. Error status (error or abort) is returned in `inGetFrameReturn`.

```
void (*PrSDKSequenceAsyncRenderCompletionProc)(
     csSDK_uint32                       inVideoRenderID,
     void*                              inCallbackRef,
     PrTime                             inTime,
     PPixHand                           inRenderedFrame,
     SequenceRender_GetFrameReturnRec   *inGetFrameReturn);
```

Parameter	Description
`inVideoRenderID`	The `outVideoRenderID` that the exporter passed to `SetAsyncRenderCompletionProc` earlier.
`inCallbackRef`	A pointer that the exporter sets using `SetAsyncRenderCompletionProc()`. This could be, for example, a pointer to an exporter instance.
`inTime`	The frame time requested.
`inRenderedFrame`	The rendered frame. The exporter is reponsible for disposing of this PPixHand using the `Dispose`() call in the PPix Suite.
`inGetFrameReturn`	A structure that contains info about the frame returned, and it includes the `inAsyncCompletionData` originally passed to `QueueAsyncVideoFrameRender`().

QueueAsyncVideoFrameRender()

Use this call rather than `RenderVideoFrame()` to queue up a request to render a specific frame asynchronously. The rendering can happen on a separate thread or processor. When the render is completed, the `PrSDKSequenceAsyncRenderCompletionProc` that was set using `SetAsyncRenderCompletionProc` will be called.

```
prSuiteError (*QueueAsyncVideoFrameRender)(
     csSDK_uint32                  inVideoRenderID,
     PrTime                        inTime,
     csSDK_uint32*                 outRequestID,
     SequenceRender_ParamsRec*     inRenderParams,
     PrRenderCacheType             inCacheFlags,
     void*                         inAsyncCompletionData);
```

Parameter	Description
`inVideoRenderID`	Pass in the `outVideoRenderID` returned from `MakeVideoRenderer()`. This gives the host the context of the video render.
`inTime`	The frame time requested.

`outRequestID`	Passes back a request ID, which... doesn't seem to have any use.
`inRenderParams`	The details of the render.
`inCacheFlags`	One or more cache flags.
`inAsyncCompletionData`	This data will be passed to the `PrSDKSequenceAsyncRenderCompletionProc` in `inGetFrameReturn.asyncCompletionData`.

PrefetchMedia()

Prefetch the media needed to render this frame. This is a hint to the importers to begin reading media needed to render this video frame.

```
prSuiteError (*PrefetchMedia)(
     csSDK_uint32   inVideoRenderID,
     PrTime         inFrame);
```

PrefetchMediaWithRenderParameters()

Prefetch the media needed to render this frame, using all of the parameters used to render the frame. This is a hint to the importers to begin reading media needed to render this video frame.

```
prSuiteError (*PrefetchMediaWithRenderParameters)(
     csSDK_uint32                inVideoRenderID,
     PrTime                      inTime,
     SequenceRender_ParamsRec*   inRenderParams);
```

CancelAllOutstandingMediaPrefetches()

Cancel all media prefetches that are still outstanding.

```
prSuiteError (*PrefetchMedia)(
     csSDK_uint32   inVideoRenderID);
```

IsPrefetchedMediaReady()

Check on the status of a prefetch request.

```
prSuiteError (*IsPrefetchedMediaReady)(
     csSDK_uint32   inVideoRenderID,
     PrTime         inTime,
     prBool*        outMediaReady);
```

MakeVideoRendererForTimeline()

Similar to `MakeVideoRenderer`, but for use by renderer plug-ins. Creates a video renderer, in preparation to get rendered video from the host. The TimelineID in question must refer to a top-level sequence.

```
prSuiteError (*MakeVideoRendererForTimeline)(
     PrTimelineID   inTimeline,
     csSDK_uint32*  outVideoRendererID);
```

MakeVideoRendererForTimelineWithFrameRate()

Similar to `MakeVideoRendererForTimeline`, with an additional frame rate parameter. This is useful for the case of a nested multicam sequence.

```
prSuiteError (*MakeVideoRendererForTimelineWithFrameRate)(
     PrTimelineID   inTimeline,
     PrTime         inFrameRate,
     csSDK_uint32*  outVideoRendererID);
```

ReleaseVideoRendererForTimeline()

Similar to `ReleaseVideoRenderer`, but for use by renderer plug-ins. Release the video renderer when the renderer plug-in is done requesting video.

```
prSuiteError (*ReleaseVideoRendererForTimeline)(
     csSDK_uint32   inVideoRendererID);
```

RenderVideoFrameAndConformToPixelFormat()

New in CS5.5. Similar to `RenderVideoFrame`., but conforms the resulting frame to a specific pixel format. Allows an exporter to request a frame in a specific pixel format.

```
prSuiteError (*RenderVideoFrameAndConformToPixelFormat)(
     csSDK_uint32                       inVideoRenderID,
     PrTime                             inTime,
     SequenceRender_ParamsRec*          inRenderParams,
     PrRenderCacheType                  inCacheFlags,
     PrPixelFormat                      inConformToFormat,
     SequenceRender_GetFrameReturnRec*  getFrameReturn);
```

MakeVideoRendererForTimelineWithStreamLabel()

New in CS6. Similar to `MakeVideoRenderer`, but is stream label-aware. Allows an exporter to request rendered frames from multiple video streams.

```
prSuiteError (*MakeVideoRendererForTimelineWithStreamLabel)(
     PrTimelineID                          inTimeline,
     PrSDKStreamLabel                      inStreamLabel,
     csSDK_uint32*                         outVideoRendererID);
```

Additional Details

Multiplexer Tab Ordering

If your exporter provides a Multiplexer tab like some of the built-in exporters do, you may find that it appears after the Video and Audio tab, rather than before those tabs as in the case of our exporters. The key is to use the following define as the parameter identifer for the multiplexer tab group:

```
#define ADBEMultiplexerTabGroup     "ADBEAudienceTabGroup"
```

Creating a Non-Editable String in the Parameter UI

During *exSelGenerateDefaultParams*, add a parameter with `exNewParamInfo.flags = exParamFlag_none`. Then during *exSelPostProcessParams*, call `AddConstrainedValuePair()` in the Export Param Suite. If you only add one value pair, then the parameter will be a non-editable string. In the case of the SDK Exporter sample, it adds two, which appear as a pair of radio buttons side-by-side.

Guidelines for Exporters in Encore

Starting in CS5, third-party exporters can now be used to transcode assets to MPEG-2 or Blu-ray compliant files. Currently, the option to choose a third-party exporter is only available on a per-clip basis, not on a project-wide basis. The user will need to right-click on an asset in the Project panel, choose Transcode Settings, and choose the third-party preset from the Quality Preset drop-down.

Prior to CS6, Encore was a 32-bit application. So if you are developing plug-ins for Encore CS5, use the CS5 headers to create 32-bit plug-ins. We have left the 32-bit configurations in the sample projects to facilitate this. Install the exporter in the Encore application folder at Plug-ins/Common/. Note that on Mac OS, this subfolder is in within the application package.

Naming Your Exporter

Encore only uses the MPEG2-DVD and MPEG2 Blu-ray formats for transcoding to MPEG2-DVD and MPEG2 Blu-ray formats, respectively. Currently it looks for the substrings “MPEG2-DVD”, “MPEG2 Blu-ray” and “H.264 Blu-ray” in the exporter name to identify the video format of the exporter, and to enable it within the Encore UI. So the format name returned from exporter plug-in should contain one of these as a substring, in order for it to be usable within Encore. For example “My MPEG2 Blu-ray”, “Accelerated MPEG2-DVD”, etc. Please avoid using the exact same names as the built-in formats to avoid conflict.

Naming Your Output

Encore uses the exporters to create elementary video and audio streams (muxing is switched to off during transcoding). The output file extensions should be standard ones: .m2v for MPEG2-DVD, MPEG2 Blu-ray video formats, .m4v for H.264 Blu-ray; .ac3 for Dolby audio, .wav for PCM, .mpa for MPEG-1 Layer 2.

Parameters

Please refer to the built-in MPEG2-DVD and MPEG2 Blu-ray formats present in Encore to get familiar with the typical exporter user interface in Encore. Having UI properties similar to the built-in formats in Encore will make it easier to integrate a third-party exporter.

The audio formats available in an exporter should correspond to the same choices as available in Encore for a DVD or Blu-ray project. In an MPEG-2 DVD exporter, the audio formats should be either Dolby Digital 2.0 (stereo), MPEG-1 Layer 2 audio in stereo or PCM audio (48kHz). For an MPEG2 Blu-ray exporter, only the Dolby and the PCM formats should be available. For more details regarding audio formats supported in Encore, please refer to the Encore help documentation. Allowing audio formats other than these for encoding will not work in Encore due to the constraints of the DVD/Blu-ray disc specifications.

Encore will need to access many of the exporter’s encoding parameters. It may even modify some of the encoding parameters during the transcoding to MPEG-2 DVD and Blu-ray formats, so that the encoding stays within the bit-budget constraints of the project. So a third-party exporter must use specific property identifiers and property types. If these parameters are not used, then there is little guarantee of the correctness of the encoded file and the size of the final disc, since Encore will not be able to control the settings of the exporter to apply the size constraints to the output files. Below is a list of the properties with their identifiers and types that an exporter plugin must support:

Property Identifier	Property type	Description

ADBEVideoWidth (required)	exParamType_int	Frame width
ADBEVideoHeight (required)	exParamType_int	Frame height
ADBEVideoVBR	exParamType_int Constrained value list	Type of encoding (constant/variable bitrate, 1 / 2 passes) 0 = CBR 1 = VBR, 1 Pass 2 = VBR, 2 Pass
ADBEVideoBitRate ADBEVideoMaxBitRate ADBEVideoAvgBitRate ADBEVideoMinBitRate	exParamType_float	Video bitrate(s) (Mbps) For CBR encoding use the first parameter. For VBR encoding use parameters 2-4.
ADBEVideoFPS (required)	exParamType_ticksFrameRate	Frame rate
ADBEMPEGCodec-BroadcastStandard (required)	exParamType_int Constrained value list	0 = NTSC 1 = PAL 2 = SECAM
ADBEVideoAspect	exParamType_int Constrained value list	Frame aspect ratio 1 = Square 1:1 2 = Standard 4:3 3 = Widescreen16:9
ADBEVMCMux_Type	exParamType_int Constrained value list	Encore needs a way to switch off muxing as it creates only elementary streams 0 = MPEG-1 1 = VCD 2 = MPEG-2 3 = SVCD 4 = DVD 5 = TS 6 = None
ADBEVideoFieldType	exParamType_int Constrained value list	0 = Progressive 1 = Upper field first 2 = Lower field first
ADBEAudioCodec (required)	exParamType_int Constrained value list	Use these 4CCs for values 'dlby' – Dolby 'PCMA' – PCM 'mpa ' – MPEG-1 Layer 2

`ADBEAudio_Endianness` (optional)	`exParamType_int` Constrained value list	If using Dolby audio; Encore will set to big endian for AC3 files 0 = little endian 1 = big endian
`ADBEAudioBitrate` (required for Dolby and MPEG-2 audio codecs)	`exParamType_int`	Audio codec bitrate (kbps)

Guidelines for Exporters in Premiere Elements

First, make sure you are building the exporter using the right SDK. Premiere Elements 8 requires the Premiere Pro CS4 SDK. The next version of Premiere Elements will likely use the CS5 SDK.

Exporter Preset

For an exporter to show up in the Premiere Elements UI, you'll need to create and install a preset in a specific location:

1) Create a folder named "`OTHERS`" in `[App installation folder]/sharingcenter/Presets/pc/`
2) Create a sub-folder with your name (e.g. MyCompany) under `OTHERS` and place the preset file (.epr) in it.
The final path of the preset file should be something like `[App installation folder]/sharingcenter/Presets/pc/OTHERS/MyCompany/MyPreset.epr`
3) Relaunch Premiere Elements.
 a. Add a clip to the timeline
 b. Goto the "Share" tab
 c. Under that choose "Personal Computer"
 d. You should see the "Others – 3rd Party Plug-ins" in the list of formats. Select this.
 e. Your preset should be seen in the drop-down.

Return Values

Premiere Elements 8 uses a slightly different definition of the return values. Use the following definition instead:

```
enum
{
	exportReturn_ErrNone = 0,
	exportReturn_Abort,
	exportReturn_Done,
	exportReturn_InternalError,
        exportReturn_OutputFormatAccept,
        exportReturn_OutputFormatDecline,
        exportReturn_OutOfDiskSpace,
        exportReturn_BufferFull,
        exportReturn_ErrOther,
        exportReturn_ErrMemory,
        exportReturn_ErrFileNotFound,
        exportReturn_ErrTooManyOpenFiles,
        exportReturn_ErrPermErr,
        exportReturn_ErrOpenErr,
        exportReturn_ErrInvalidDrive,
        exportReturn_ErrDupFile,
        exportReturn_ErrIo,
        exportReturn_ErrInUse,
        exportReturn_IterateExporter,
        exportReturn_IterateExporterDone,
        exportReturn_InternalErrorSilent,
        exportReturn_ErrCodecBadInput,
        exportReturn_ErrLastErrorSet,
        exportReturn_ErrLastWarningSet,
        exportReturn_ErrLastInfoSet,
        exportReturn_ErrExceedsMaxFormatDuration,
        exportReturn_VideoCodecNeedsActivation,
        exportReturn_AudioCodecNeedsActivation,
        exportReturn_IncompatibleAudioChannelType,
        exportReturn_Unsupported = -100
};
```

The red values are unique to Premiere Elements 8, and shifted the subsequent return values 2 values higher than their definition in the Premiere Pro SDK.

9 Transmitters

Starting in CS6, the Transmit API is the preferred means for external hardware monitoring. This new API provides support for pushing video, audio, and closed captions to external hardware. Transmitters can be specified by the user in Preferences > Playback. Other plug-ins such as importers and effects with settings preview dialogs can send video out to the active transmitter, opening up new possibilities for hardware monitoring. Transmit plug-ins are supported in Premiere Pro, After Effects (starting in CC 2014), SpeedGrade, Encore, and Prelude (note that since Prelude CS6 Windows is a 32-bit application, it uses 32-bit transmitter plug-ins).

When a new transmitter instance is created, it is asked to describe the format(s) it wishes to receive the rendered video in. A transmitter plug-in can request different formats depending on the source clip or timeline format. The host application will handle all the conversions to the desired video format. As an example, a transmitter instance may specify that it can only handle a fixed width and height, but any pixel format. Besides video conversions, the host handles scheduling for prefetching the media and asynchronous rendering.

A transmitter may leave the audio to be played by the host, through the system's sound drivers (ASIO or CoreAudio). Or, if a transmitter wants to handle the audio itself to send it to the external hardware, it can request audio using `GetNextAudioBuffer` in the Playmod Audio Suite.

On playback, the host provides the transmitter with a clock callback, which the transmitter must call to update the host with the new time every frame. This allows the transmitter to orchestrate the audio/video sync.

Transmitters can use the Captioning Suite to get any closed captions for the sequence.

Transmitters do not need to call the Playmod Device Controller suite to handle Export to Tape. This is handled at the player level.

What's New in Premiere Pro CS6.0.2?

A transmitter can now provide strings to label its audio channels, in `tmAudioMode.outOutputAudioNames`. These strings will be used for the Audio Output Mapping preferences, rather than the default strings.

Transmitter Basics

Basic Organization

A transmitter module can define multiple plug-ins. Each plug-in can appear in the Playback Preferences as an option for video playback and/or audio playback. Only one transmitter can be used for audio, since the transmitter used for audio drives the clock. Multiple transmitters may be selected for video simultaneously.

When active, multiple instances of a single plug-in can be created. An instance is created to display a clip or sequence. Hardware access is regulated through `ActivateDeactivate`. Only an active instance should access the hardware.

Video Formats

Specify which video format(s) you wish to receive during `QueryVideoMode`. To simplify your plug-in, be as specific as possible, and allow the host to perform the conversion asynchronously ahead of time. Packed and compressed formats are also supported. If multiple formats are specified, the closest will be selected at render time. If your transmitter would benefit from on-GPU frames, please let us know.

When sent `QueryVideoMode`, the transmitter is informed about the clip/sequence video attributes by being passed a `tmInstance` pointer. So, for example, if the transmitter instance is constructed to support a 1920x1080 timeline, it can report that same size back to the host application, so that it will not have to handle any scaling. If, for example, it does handle scaling, and it is constructed to handle a 1440x1080 timeline, it can report 1440x1080 and handle the scaling itself. In this way you can choose a single fixed size depending on the timeline.

When video frames are pushed to the transmitter, properties like pixel format may change on a segment-by-segment basis depending on the source footage. Other properties like size may change based on the current fractional resolution, which may differ between scrubbing and stopped.

Fractional Resolution

In the Premiere Pro Source and Program Monitors, the user can choose independent resolutions for rendering during playback and paused modes. For example, it is common to have the playback resolution set to half, and paused resolution set to full.

If an output card has a hardware scaler, the transmit plug-in can declare support for fractional resolutions. For example, for a 1920x1080 instance, it could declare support for not only 1920x1080, but also 960x540, 480x270, etc. This will allow the renderer to skip the step of rescaling back up to full resolution after rendering at a fractional resolution. If however, the plug-in only declares support for full resolution, the renderer will scale the video back up before pushing it to the transmitter.

Audio Format

During `QueryAudioMode`, a transmitter will be told how many channels the instance has. The transmitter should change that value based on what it can support and then make sure the buffers it provides match that. Although Premiere Pro can support 32 channels of audio, transmitters can only support up to 16 channels of audio.

As of CS6, sequences will currently always report audio available in `CreateInstance`, even if empty. An example of somewhere that a transmitter will be called with no audio is for video output from the RED settings dialog, which is video only.

A transmitter should call `GetNextAudioBuffer` only when `inAudioActive` is passed as true to `ActivateDeactivate`.

Frame Rate

For framerate, video will be pushed to you at the rate of the timeline. This was chosen because of the wide variety in conversion policies, including pulldown, frame duplication, etc.

Dropped Frames

If the host cannot keep up rendering, it will send duplicate frames with PushVideo. If you receive a frame that cannot be sent out to hardware on time, notify the host using `inDroppedFrame-Callback` in `tmPlaybackClock`. In Premiere Pro, the user can turn on the Dropped Frame Indicator to see the total number of frames that were dropped either because the host couldn't keep up, or the hardware couldn't keep up.

Sync Between Application UI and Hardware Output

Naturally there is some latency between the time the host sends frames to be displayed on the output, and the time it can actually be displayed. Use `tmVideoMode.outLatency` to specify the latency. For example, if a transmitter specifies 5 frames of latency, when the user starts playback, the host will send 5 frames of video to the transmitter before sending StartPlaybackClock. This allows time for the transmitter to send frames to the hardware output in advance, so that the hardware output will be in sync with the monitor in the host application UI.

When the user is scrubbing in the timeline, send the video frames as fast as possible to the output. The host application UI will not wait for the hardware output to catch up, and currently as of 6.0.1 there may be a noticable latency. To reduce the scrubbing latency as much as possible, when scrubbing or stopped the transmitter should cancel any frames it has pending to immediately display the new one.

Dog Ears

Turn on dog ears to view statistics about the frames being sent to the transmitter. This is useful to view information such as pixel formats and much more. Note that this mode may result it duplicate PushVideo calls made for a single frame.

Closed Captioning

This captioning data is attached to a sequence by the user via menu items in the Sequence menu. In the Program Monitor, the Closed Captioning Display options in the fly-out menu give the user control over the display. The hardware should always transmit any Closed Captioning data, and the user can go through the hardware monitor's on-screen display menu to choose which caption track to view. The closed captioning data is accessible using the new Captioning Suite. Use this data for the hardware output.

Driving Transmitters from Other Plug-ins

Transmitters can be driven by many areas of the Premiere Pro interface. Currently, they are called to show frames from the Program Monitor and Source Monitor. But other types of plug-ins can use the Transmit Invocation Suite to push frames to transmitters. For example, an effect or titler with a modal setup dialog could push frames to the output.

Entry Point

This entry point function will be called once on load, and once on unload.

```
tmResult (*tmEntryFunc)(
     csSDK_int32          inInterfaceVersion,
     prBool               inLoadModule,
     piSuitesPtr          piSuites,
     tmModule*            outModule)
```

A `tmModule` is a structure of function pointers, which the transmitter implements.

tmModule Functions

Fill in 0 for any unsupported calls. Thread safety is defined per-module, only a single thread will enter a module at a time.

Member	Description

`Startup`	`tmResult (*Startup)(`
	`     tmStdParms*    ioStdParms,`
	`     tmPluginInfo*  outPluginInfo);`
	
	Initialize a transmitter, fill in basic plug-in info, allocate memory to hold user settings and other data. `tmResult_ContinueIterate` may be returned to support multiple transmit plug-ins within the same module. `ioPrivatePluginData`, `ioSerializedPluginData` & `ioSerializedPluginDataSize` may be written from `Startup`.

`Shutdown`	`tmResult (*Shutdown)(`
	`     tmStdParms*    ioStdParms);`
	
	Terminate a transmitter. Dispose of `ioPrivatePluginData` if previously allocated in `Startup`.

`QueryAudioMode`	`tmResult (*QueryAudioMode)(`
	`     const tmStdParms*   inStdParms,`
	`     const tmInstance*   inInstance,`
	`     csSDK_int32 inQueryIterationIndex,`
	`     tmAudioMode*        outAudioMode);`
	
	Describe the audio modes supported by the transmitter, one at a time. Note that currently one audio mode is currently supported. You can convert between audio formats using the Audio Suite.

`QueryVideoMode`	`tmResult (*QueryVideoMode)(`
	`     const tmStdParms*   inStdParms,`
	`     const tmInstance*   inInstance,`
	`     csSDK_int32 inQueryIterationIndex,`
	`     tmVideoMode*        outVideoMode);`
	
	Describe the video modes supported by the transmitter, one at a time. The video sent later in `PushVideo` will be one of the formats specified here.

`SetupDialog`	`tmResult (*SetupDialog)(`
	`     tmStdParms*    ioStdParms,`
	`     prParentWnd    inParent);`
	
	Display your own modal settings dialog. Will only be called if the plugin returned `outHasSetup`. Save any settings to `ioSerializedPluginData` and if needed update `ioSerializedPluginDataSize`. `NeedsReset` will be invoked after this call, to allow your transmitter a chance to reset all open plug-ins and startup with the new settings.

`NeedsReset`	`tmResult (*NeedsReset)(`
	`     const tmStdParms*   inStdParms,`
	`     prBool*             outResetModule);`
	
	Will be called regularly on the first plug-in of a module to allow rebuilding on state changes. If the passed in settings differ enough from the created settings, or if the settings on the hardware itself have changed, the transmitter should specify a reset is needed. If `outResetModule` is set to true, all open plug-ins will be shut-down and started up again.

`CreateInstance`	`tmResult (*CreateInstance)(`
	`     const tmStdParms*   inStdParms,`
	`     tmInstance*         ioInstance);`
	
	Creates an instance of a transmitter. `inPlayID` and `inTimelineID` may be 0 if not driven by a player. Multiple instances may be created at the same time. Allocate `ioPrivateInstanceData`.

`DisposeInstance`	`tmResult (*DisposeInstance)(`
	`     const tmStdParms*   inStdParms,`
	`     tmInstance*         ioInstance);`
	
	Dispose an instance of a transmitter. Any `ioPrivateInstanceData` should be disposed.

`ActivateDeactivate`	`tmResult (*ActivateDeactivate)(`
	`     const tmStdParms*    inStdParms,`
	`     const tmInstance*    inInstance,`
	`     PrActivationEvent    inActivationEvent,`
	`     prBool               inAudioActive,`
	`     prBool               inVideoActive);`
	
	Activate or deactivate a transmitter instance, for example during application suspend or switching between monitors. Transmitters should manage hardware access with these calls, not Startup/ Shutdown, since it is valid for multiple plugins to be simultaneously active for the same device. Audio and video may be independently activated.

`StartPlaybackClock`	`tmResult (*StartPlaybackClock)(`
	`     const tmStdParms*         inStdParms,`
	`     const tmInstance*         inInstance,`
	`     const tmPlaybackClock*    inClock);`
	
	Start a clock for playback. This will be sent not only when starting playback, but also for scrubbing. Will only be called if the transmitter returned `outHasClock`. The provided callback must be called each time the time changes, for example once for each frame in response to `PushVideo`. Start may be called multiple times without a stop in between to update playback parameters, for example if the speed changes during playback. Invoke the callback immediately during `StartPlaybackClock` with a negative number for preroll but do not use this to wait for frames. If video latency is specified, up to the latency's amount of frame marked as `playmode_Playing` will be sent before `StartPlaybackClock` is called.

`StopPlaybackClock`	`tmResult (*StopPlaybackClock)(`
	`     const tmStdParms*         inStdParms,`
	`     const tmInstance*         inInstance);`
	
	Stop a clock for playback.

`PushVideo`	`tmResult (*PushVideo)(`
	`const tmStdParms* inStdParms,`
	`const tmInstance* inInstance,`
	`const tmPushVideo* inPushVideo);`
	
	Asynchronously pushes a video frame to a transmitter instance. Will only be called if the transmitter returned `outHasVideo`. The list of video frames passed to the transmitter will be negotiated based on the properties returned from `QueryVideoMode`. The transmitter is responsible for disposing of all passed in PPixes.
	
	The instance will be created with the properties of the creating video segments which may differ from the actual frames that will be sent to the transmitter. For example, if a sequence is being played at 1/2 resolution, the instance will be created with the dimensions of the sequence, but the frames rendered and sent to the transmitter will be at 1/2. These properties may change by segment, for example if your transmitter supports multiple pixel formats, different segments may render to different pixel formats.

tmModule Structures

tmStdParms

This is passed to all calls. Most of it is allocated and filled in by the transmitter on `Startup`, and may be modified during `SetupDialog`.

```
typedef struct
{
     csSDK_int32    inPluginIndex;
     PrMemoryPtr    ioSerializedPluginData;
     csSDK_size_t   ioSerializedPluginDataSize;
     void*          ioPrivatePluginData;
     piSuitesPtr    piSuites;
} tmStdParms;
```

`inPluginIndex`	If the plug-in has defined multiple transmitters in the same module, this index value tells them apart.

ioSerializedPluginData	This data should contain user-selectable settings for the transmitter, that would be shown in the transmitter settings dialog, and need to persist so they can be saved and restored from one session to another. When allocating this for the first time during `Startup`, this must be allocated using `NewPtr` so it can be disposed by the host on shutdown. This must be flat memory that can be serialized by by the host and will be already filled in when `Startup` is called if previously available.
ioSerializedPluginDataSize	Size of the data above. Set this during `Startup`, if not already set.
ioPrivatePluginData	This data should contain any memory needed for use across calls to the transmitter, except the settings data stored in `ioSerializedPluginData`. Allocate this during `Startup`. Unlike `ioSerializedPluginData`, it does not need to be flat, and must be disposed of by the plug-in on `Shutdown`.

tmPluginInfo

This is to be filled in by the transmitter on `Startup`.

```
typedef struct
{
     prPluginID     outIdentifier;
     unsigned int   outPriority;
     prBool         outAudioAvailable;
     prBool         outAudioDefaultEnabled;
     prBool         outClockAvailable;
     prBool         outVideoAvailable;
     prBool         outVideoDefaultEnabled;
     prUTF16Char    outDisplayName[256];
     prBool         outHideInUI;
     prBool         outHasSetup;
     csSDK_int32    outInterfaceVersion;
} tmPluginInfo;
```

outIdentifier	Persistent plugin identifier.
outPriority	0 is default, higher priority wins.
outAudioAvailable	Set this to `kPrTrue` if the transmitter supports audio.

`outAudioDefaultEnabled`	Set this to `kPrTrue` if you want to be turned on to handle audio by default.
`outClockAvailable`	Set this to `kPrTrue` if providing plug-in based audio. Currently, even if using host-based audio, a transmitter must provide a clock - please let us know if you would like to use host-based audio only, and we will log a bug on this.
`outVideoAvailable`	Set this to `kPrTrue` if the transmitter supports video.
`outVideoDefaultEnabled`	Set this to `kPrTrue` if you want to be turned on to handle video by default.
`outDisplayName[256]`	Set the display name of the transmitter, up 256 UTF-16 characters, including NULL terminator.
`outHideInUI`	Set this to `kPrTrue` if you don't want this to show up as a user-selectable option in the transmitter choices.
`outHasSetup`	Set this to `kPrTrue` if providing a setup dialog.
`outInterfaceVersion`	Set this to the `tmInterfaceVersion` that the transmitter is being compiled for.

tmInstance

This structure contains information for the transmitter to use for initializing an instance.

```
typedef struct
{
     csSDK_int32         inInstanceID;
     PrTimelineID        inTimelineID;
     PrPlayID            inPlayID;

     prBool              inHasAudio;
     csSDK_uint32        inNumChannels;
     PrAudioChannelLabel inChannelLabels[16];
     PrAudioSampleType   inAudioSampleType;
     float               inAudioSampleRate;

     prBool              inHasVideo;
     csSDK_int32         inVideoWidth;
     csSDK_int32         inVideoHeight;
     csSDK_int32         inVideoPARNum;
     csSDK_int32         inVideoPARDen;
     PrTime              inVideoFrameRate;
     prFieldType         inVideoFieldType;

     void*               ioPrivateInstanceData;
} tmInstance;
```

`inInstanceID`	Instance identifier.
`inTimelineID`	TimelineID, for use with various suite functions. May be 0.
`inPlayID`	PlayID, for use with various suite functions. May be 0.
`inHasAudio`	True if the instance is handling a sequence with audio.
`inNumChannels`	The number of audio channels.
`inChannelLabels[16]`	The identifiers for each audio channel.
`inAudioSampleType`	The format of the audio data.
`inAudioSampleRate`	The sample rate of the audio data.
`inHasVideo`	True if the instance is handling a sequence with video.
`inVideoWidth` `inVideoHeight`	The video resolution.
`inVideoPARNum` `inVideoPARDen`	The numerator and denominator of the video pixel aspect ratio.
`inVideoFrameRate`	The frame rate of the video.
`inVideoFieldType`	The field dominance of the video.
`ioPrivateInstanceData`	May be written by plug-in in `CreateInstance`, and disposed of by `DisposeInstance`. Need not be serializable by the host.

tmAudioMode

A full description of an audio mode that the transmitter will support. The transmitter should fill in this information during `QueryAudioMode`.

```
typedef struct
{
     float               outAudioSampleRate;
     csSDK_uint32        outMaxBufferSize;
     csSDK_uint32        outNumChannels;
     PrAudioChannelLabel outChannelLabels[16];
     PrTime              outLatency;
     PrSDKString         outAudioOutputNames[16]
} tmAudioMode;
```

`outAudioSampleRate`	The preferred audio sample rate.
`outMaxBufferSize`	The maximum audio buffer size needed if the transmitter uses plug-in-based audio to request audio buffers using the Playmod Audio Suite.

`outNumChannels`	The maximum number of audio channels supported.
`outChannelLabels[16]`	Set the audio channel configuration for the output hardware using the appropriate identifiers for each audio channel.
`outLatency`	This value is only used for playback, not when scrubbing. It specifies how early to send frames in advance when audio-only playback starts, and how many frames that will be sent prior to a `StartPlaybackClock` call. Use this value to get playback in sync between the Source/Program Monitors and external hardware output. All modes must have the same latency. Take care to not set this value any higher than necessary, since playback start will delayed by this amount. A value equivalent to 5 video frames or less is recommended.
`outAudioOutputNames[16]`	New in CS6.0.2. These must be displayable names of physical audio outputs like "XYZ HD Speaker 1" The audio output names in tmAudioMode should be allocated by the plug-in using the String Suite and NOT disposed by the plugin. The host will take care of disposing these strings.

tmVideoMode

A full description of a video mode that the transmitter will support. Transmitter should fill in this information during `QueryVideoMode`.

```
typedef struct
{
     csSDK_int32    outWidth;
     csSDK_int32    outHeight;
     csSDK_int32    outPARNum;
     csSDK_int32    outPARDen;
     prFieldType    outFieldType;
     PrPixelFormat  outPixelFormat;
     PrSDKString    outStreamLabel;
     PrTime         outLatency;
} tmVideoMode;
```

`outWidth`	The preferred video resolution. Set to 0 if any resolution is supported.
`outHeight`	
`outPARNum`	The preferred video pixel aspect ratio. Set to 0 if any pixel aspect ratio is supported.
`outPARDen`	

`outFieldType`	The supported video field type. Set to `prFieldsAny` if any field dominance is supported.
`outPixelFormat`	The preferred video pixel format. Set to `PrPixelFormat_Any` if any format is acceptable. If your transmitter would benefit from on-GPU frames, please let us know.
`outStreamLabel`	Leave this as 0 for now. Stream labels are not yet supported by transmitters (bug group BG127571)
`outLatency`	This value is only used for playback, not when scrubbing. It specifies how early to send frames in advance when playback starts, and how many frames that will be sent prior to a `StartPlaybackClock` call. Use this value to get playback in sync between the Source/Program Monitors and external hardware output. All modes must have the same latency. Take care to not set this value any higher than necessary, since playback start will delayed by this amount. A value equivalent to 5 frames or less is recommended.

tmPlaybackClock

This structure is filled out by the host and sent to the transmitter to describe the playback clock to be managed by the transmitter. The transmitter uses the callback here to update the host at regular intervals.

```
typedef struct
{
     tmClockCallback            inClockCallback;
     void*                      inCallbackContext;
     PrTime                     inStartTime;
     pmPlayMode                 inPlayMode;
     float                      inSpeed;
     PrTime                     inInTime;
     PrTime                     inOutTime;
     prBool                     inLoop;
     tmDroppedFrameCallback     inDroppedFrameCallback;
} tmPlaybackClock;
```

`tmClockCallback`	A pointer to a call with the following signature:
	
	`void (*tmClockCallback)(`
	`     void*     inContext,`
	`     PrTime    inRelativeTimeAdjustment);`
	
	Call this function when the time changes with a non-speed adjusted amount to increment the clock by. This can be called once per frame in response to `PushVideo`.
	
	Using a negative time should only be used to wait for device, not to achieve sync. The transmitter will not receive any frames while using a negative time.
	
	After the first positive valued clock callback, the time will be `inStartTime` + `inRelativeTimeAdjustment` * `inSpeed`.

`inCallbackContext`	Pass this into the clock callback above.
`inStartTime`	Start the clock at this time.
`inPlayMode`	Specifies whether the `StartPlaybackClock` was set for playback or scrubbing.
`inSpeed`	1.0 is normal speed, -2.0 is double speed backwards. Informational only. This is useful for the built-in DV transmitter, which only writes DV captions if playing at regular speed.
`inInTime`	Informational only and will be handled by the host.
`inOutTime`	
`inLoop`	

`inDroppedFrame-Callback`	A pointer to a call with the following signature:
	
	`void (*tmDroppedFrameCallback)(`
	`     void*          inContext,`
	`     csSDK_int64    inNewDroppedFrames);`
	
	Use this call to report frames pushed to the transmit plug-in on `PushVideo` but not delivered to the device. If every frame pushed to the transmitter is sent out to hardware on time, then this should never need to be called as the host will count frames not pushed to the plug-in.
	
	`inNewDroppedFrames` should be the number of additional dropped frames since the last time `tmDroppedFrameCall-back` was called.

tmPushVideo

Describes a frame of video to be transmitted.

```
typedef struct
{
     PrTime                   inTime;
     pmPlayMode               inPlayMode;
     PrRenderQuality          inQuality;
     const tmLabeledFrame*    inFrames;
     csSDK_size_t             inFrameCount;
} tmPushVideo;
```

`inTime`	Describes which frame of the video is being passed in. A negative value means the frame should be displayed immediately. Use this value to determine the corresponding timecode for the frame being pushed.
`inPlayMode`	Pass this into the clock callback above.
`inQuality`	The quality of the render.

`inFrames`	The frame or set of frames to transmit. As of CS6, this will always be a single frame. `tmLabeledFrame` is defined as:
	
	`typedef struct`
	`{`
	`     PPixHand           inFrame;`
	`     PrSDKStreamLabel   inStreamLabel;`
	`} tmLabeledFrame;`
	
	The frame(s) must be disposed of by the transmitter when done.

`inFrameCount`	The number of frames in `inFrames`.

Suites

For information on how to acquire and manage suites, as well as information on more suites that are available to other plug-in types beyond just transmitters, see the SweetPea Suites section.

Playmod Audio Suite

This suite is used to play audio during playback. There are many more functions that were used by players, still documented in the players chapter. Here we will only consider the single call in the suite that is relevant to transmitters.

Host-Based, or Plug-in Based Audio?

A transmitter has two choices for playing audio: it can ask the host to play the audio through the audio device selected by the user, or it can get audio buffers from the host and handle its own playback of audio.

GetNextAudioBuffer

Retrieves from the host the next contiguous requested number of audio sample frames, specified in `inNumSampleFrames`, in `inInBuffers` as arrays of uninterleaved floats. The plug-in must manage the memory allocation of `inInBuffers`, which must point to n buffers of floating point values of length `inNumSampleFrames`, where n is the number of channels. This call is only available if `InitPluginAudio` was used. Returns `suiteError_NoError`, `suiteError_PlayModuleAudioNotInitialized`, or `suiteError_PlayModuleAudioNotStarted`.

```
prSuiteError (*GetNextAudioBuffer)(
     csSDK_int32    inPlayID,
     float**        inInBuffers,
     float**        outOutBuffers,
     unsigned int   inNumSampleFrames);
```

Parameter	Description
`inInBuffers`	Currently unused in CS6. A pointer to an array of buffers holding `inNumSampleFrames` input audio in each buffer, corresponding to the total number of available input channels.
`outOutBuffers`	A pointer to an array of buffers `inNumSampleFrames` long into which the host will write the output audio. There must be N buffers, where N is the number of output channels for the output channel type specified in `InitPluginAudio`.
`inNumSampleFrames`	The size of each of the buffers in the array in both `inInBuffers` and `outOutBuffers`.

Transmit Invocation Suite

This suite can be used by other types of plug-ins to push frames to transmitters. For example, an effect or titler with a modal setup dialog could push frames to the output.

10 Video Filters

We strongly recommend using the After Effects SDK to develop effects plug-ins. Almost all of the effects included in Premiere Pro are After Effects plug-ins, and future development will be based on the After Effects API.

Video filters process a video frame into a destination frame. Filter parameters can vary with time. Premiere provides basic user interface in the Effect Controls panel, drawing sliders, color pickers, angle dials, and checkboxes based on the parameter definitions in the PiPL resource. Video filters can have their own custom modal setup dialog for additional settings.

If you've never developed a video filter before, you can skip the What's New section, and go directly to Getting Started.

What's New

What's New in Premiere Pro CS5?

In the Effects panel, video filters now appear with badges to advertise if they support YUV, 32-bit, and accelerated rendering. The user can filter the list of effects to show only the effects that support those rendering modes. Video filters will automatically receive YUV and 32-bit badges if they advertise support using the existing *fsGetPixelFormatsSupported*. Custom badges can also be created. See Effect Badging for more information.

What's New in Premiere Pro CS3?

Checkbox controls are now supported directly in the Effect Controls panel.

Filters can specify whether or not they want a setup button in the Effect Controls panel during *fsHasSetupDialog*, by returning `fsHasNoSetupDialog` or `fsNoErr`. Previously, this was set in the PiPL resource.

Getting Started

Begin with one of the two video filter sample projects, progressively replacing its functionality with your own.

Resources

Filter plug-ins can use PiPL resources to define their behaviors and supported properties. To provide any parameters in the Effect Controls panel, they must be defined in the PiPL in `ANIM_ParamAtom` sections, as demonstrated in the example below. The 'no UI' UI type is for non-keyframeable parameters. After making changes to the PiPL, rebuild the plug-in each time, so that the PiPL will be recompiled.

A Filter PiPL Example

```
#include "PrSDKPiPLVer.h"
#ifndef PRWIN_ENV
#include "PrSDKPiPL.r"
#endif

// The following two strings should be localized
#define plugInName "Cool Video Filter"
#define plugInCategory "SDK Filters"

// This name should not be localized or updated
#define plugInMatchName "SDK Cool Filter"

resource 'PiPL' (16000) {
{
	// The plug-in type
	Kind {PrEffect},

	// The plug-in name as it will appear to the user
	Name {plugInName},

	// The internal name of this plug-in
	AE_Effect_Match_Name {plugInMatchName},

	// The folder containing the plug-in in the Effects Panel
	Category {plugInCategory},

	// The version of the PiPL resource definition
	AE_PiPL_Version {PiPLVerMajor, PiPLVerMinor},
    // The ANIM properties describe the filter parameters, and also how the data is stored
            in the project file.  There is one ANIM_FilterInfo property followed by n ANIM_
            ParamAtoms
    ANIM_FilterInfo {
        0,
#ifdef PiPLVer2p3
        // Non-square pixel aspect ratio supported
        notUnityPixelAspectRatio,
        anyPixelAspectRatio,
        reserved4False,
        reserved3False,
        reserved2False,
#endif
        reserved1False,  // These flags are for use by After Effects
        reserved0False,  // Not used by Premiere
        driveMe,  // Not used by Premiere
        needsDialog,  // Not used by Premiere
        paramsNotPointer,  // Not used by Premiere
        paramsNotHandle,  // Not used by Premiere
        paramsNotMacHandle,  // Not used by Premiere
        dialogNotInRender,  // Not used by Premiere
        paramsNotInGlobals,  // Not used by Premiere
        bgAnimatable,  // Not used by Premiere
        fgAnimatable,  // Not used by Premiere
        geometric,  // Not used by Premiere
        noRandomness,  // Not used by Premiere
        // Put the number of parameters here
        2,
        plugInMatchName
    },

    // There is one ANIM_ParamAtom for each parameter
    ANIM_ParamAtom {
        // This is the first property - Zero based count
        0,
        // The name to appear for the control
        "Level",
        // Parameter number goes here - One based count
        1,
        // Put the data type here
        ANIM_DT_SHORT,
        // UI control type
        ANIM_UI_SLIDER,
        0x0,
        0x0,  // valid_min (0.0)
        0x405fc000,
        0x0,  // valid_max (127.0)
        0x0,
        0x0,  // ui_min (0.0)
        0x40590000,
        0x0,  // ui_max (100.0)
#if PiPLVer2p3
        // New - Scale/dontScale UI Range if user modifies
        dontScaleUIRange,
#endif
        // Set/don't set this if the param should be animated
        animateParam,
        dontRestrictBounds,  // Not used by Premiere
        spaceIsAbsolute,  // Not used by Premiere
        resIndependent,  // Not used by Premiere
        // Bytes size of the param data
        2
    },

    ANIM_ParamAtom {
        1,
        "Target Color",
        2,
        // Put the data type here
        ANIM_DT_COLOR_RGB,
        // UI control type
        ANIM_UI_COLOR_RGB,
        0x0,
        0x0,
        0x0,
        0x0,
        0x0,
        0x0,
        0x0,
        0x0,
#ifdef PiPLVer2p3
        dontScaleUIRange,
#endif
        // Set/don't set this if the param should be animated
        animateParam,
        dontRestrictBounds,
        spaceIsAbsolute,
        resIndependent,
        // Bytes size of the param data
        4
    },
}
};
```

Entry Point

```
short xFilter (
     short          selector,
     VideoHandle    theData)
```

selector is the action Premiere wants the video filter to perform. `EffectHandle` provides source and destination buffers, and other useful information. Return `fsNoErr` if successful, or an appropriate return code.

Selector Table

This table summarizes the various selector commands a video filter can receive.

Selector	Description
fsInitSpec	(optional) Allocate and initialize your parameters with default values without popping a modal setup dialog.
fsHasSetupDialog	(optional) New for Premiere Pro CS3. Specify whether or not the filter has a setup dialog.
fsSetup	(optional) Allocate memory for your parameters if necessary. Display your modal setup dialog with default parameter values or previously stored values. Save the new values to `specsHandle`.
fsExecute	Filter the video using the stored parameters from `specsHandle`. Be aware of interlaced video, and don't overlook the alpha channel!
fsDisposeData	(optional) Dispose of any instance data created during *fsExecute*.
fsCanHandlePAR	(optional) Tell Premiere how your effect handles pixel aspect ratio.
fsGetPixelFormatsSupported	(optional) Gets pixel formats supported. Called iteratively until all formats have been given.
fsCacheOnLoad	(optional) Return `fsDoNotCacheOnLoad` to disable plug-in caching for this filter.

Selector Descriptions

fsInitSpec

Responding to this selector is optional. This selector is sent when the filter is applied to a clip and the plug-in is called for the first time. This call can be used to initialize the plug-in parameters with default values in order to achieve an initial "silent setup", in which *fsSetup* is skipped when the filter is applied to a clip, to avoid popping the modal dialog that may be needed in *fsSetup*.

Allocate and pass back a handle to a structure containing the parameter values in specsHandle. The filter is given the total duration (in samples), and number of the first sample in the source buffer.

fsHasSetupDialog

New for Premiere Pro CS3. Optional. Specify whether or not the filter has a setup dialog, by returning `fsHasNoSetupDialog` or `fsNoErr`.

fsSetup

Optional. Sent when the filter is applied, if *fsInitSpec* doesn't allocate a valid `specsHandle`. Also sent when the user clicks on the setup link in the Effect Controls Panel. The filter can optionally display a (platform-dependent) modal dialog to get new parameter values from the user. First, check `VideoHandle.specsHandle`. If NULL, the plug-in is being called for the first time. Initialize the parameters to their default values. If non-NULL, load the parameter values from `specsHandle`. Now use the parameter values to display a modal setup dialog to get new values. Return a handle to a structure containing the parameter values in `specsHandle`.

In order to properly store parameter values between calls to the plug-in, describe the structure of your `specsHandle` data in your PiPL's `ANIM` properties. Premiere interpolates animatable parameter values as appropriate before sending *fsExecute*.

The filter is given the total duration in samples and the sample number of the first sample in the source buffer.

During *fsSetup*, the frames passed to `VideoRecord.source` will almost always be 320x240. The exception is if the plug-in is receiving the fsSetup selector when the effect is initially applied, in which case it will receive a full height frame, with the width adjusted to make the frame square pixel aspect ratio. For example, a filter applied in a 1440x1080 HDV sequence will receive a full 1920x1080 buffer. The frame is the layer the filter is applied to at the current time indicator. If the CTI is not on the clip the filter is applied to, the frame is transparent black.

If the filter has a setup dialog, the `VFilterCallbackProcPtr` should be used to get source frames for previews. `getPreviewFrameEx` can be used to get rendered frames, although if this call is used, the video filter should be ready to be called reentrantly with *fsExecute*.

fsExecute

This is really the only required selector for a video filter, and it's where the rendering happens. Take the input frame in `VideoHandle.source`, render the effect and return the frame to Premiere in `VideoHandle.destination`. The `specsHandle` contains your parameter settings (already interpolated if animatable). You can store a handle to any additional non-parameter data in `VideoHandle.InstanceData`. If you do so, deallocate the handle in response to *fsDisposeData*, or your plug-in will leak memory.

The video your filter receives may be interlaced, in the field order determined by the project settings. If interlaced, your plug-in will be called twice for each frame of video, and each `PPix` will be half the frame height.

fsDisposeData

Optional. Called when the project closes. Dispose of any instance data created during *fsExecute*. See `VideoHandle->InstanceData`.

fsCanHandlePAR

Optional. Indicate how your filter wants to handle pixel aspect ratio by returning a combination of the following flags.

This selector is only sent if several conditions are met. The pixel aspect ratio of the clip to which the filter is applied must be known, and not be square (1.0). The clip must not be a solid color. The PiPL bits `anyPixelAspectRatio` and `unityPixelAspectRatio` must not be set.

Flag	Description
`prEffectCanHandlePAR`	Premiere should not make any adjustment to the source image to compensate for PAR
`prEffectUnityPARSetup`	Premiere should render the source image to square pixels during *fsSetup*
`prEffectUnityPARExecute`	Premiere should render the source image to square pixels during *fsExecute*

fsGetPixelFormatsSupported

Optional. Gets pixel formats supported. Called iteratively until all formats have been given. Set `(*theData)->pixelFormatSupported` to a supported pixel format, and return `fsNoErr`. When all formats have been described, return `fsBadFormatIndex`. See the field-aware video filter sample for an example.

fsCacheOnLoad

Optional. Return `fsDoNotCacheOnLoad` to disable plug-in caching for this filter.

Return Codes

Return Code	Reason
`fsNoErr`	Operation has completed without error.
`fsBadFormatIndex`	Return from *fsGetPixelFormatsSupported* when all pixel formats have been enumerated.
`fsDoNotCacheOnLoad`	Return from *fsCacheOnLoad* to disable plug-in caching for this filter.
`fsHasNoSetupDialog`	Return from *fsHasSetupDialog* to disable setup button in Effect Controls panel
`fsUnsupported`	The selector is not recognized, or unsupported.

VideoRecord

A video filter is passed a handle to a `VideoRecord` with almost every selector.

```
typedef struct {
     PrMemoryHandle           specsHandle;
     PPixHand                 source;
     PPixHand                 destination;
     csSDK_int32              part;
     csSDK_int32              total;
     char                     previewing;
     void *                   privateData;
     VFilterCallBackProcPtr   callBack;
     BottleRec *              bottleNecks;
     short                    version;
     short                    sizeFlags;
     csSDK_int32              flags;
```

```
    TDB_TimeRecord *         tdb;
    PrMemoryHandle           instanceData;
    piSuitesPtr              piSuites;
    PrTimelineID             timelineData;
    char                     altName[MAX_FXALIAS];
    PrPixelFormat            pixelFormatSupported;
    csSDK_int32              pixelFormatIndex;
    csSDK_uint32             instanceID;
    TDB_TimeRecord           tdbTimelineLocation;
    csSDK_int32              sessionPluginID;
} VideoRecord, **VideoHandle;
```

`specsHandle`	Instance settings, persistent across Premiere sessions. Create this handle during *fsInitSpec* or *fsSetup*. Populated by Premiere if the filter's parameters can be manipulated in the Effect Controls Panel. Use Premiere's memory allocation callbacks to allocate memory for the `specsHandle`.
`source`	`PPixHand` for the source video frame.
`destination`	`PPixHand` for the destination video frame, always the same size as source. Store the output frame here during *fsExecute*.
`part`	How far into the effect you are. part varies from 0 to total, inclusive.
`total`	Total length of the video filter. Divide part by total to calculate the percentage of the time-variant filter for a given *fsExecute*. This value doesn't necessarily correspond to frames or fields.
`previewing`	Unsupported
`privateData`	Data private to Premiere. Pass to the frame-retrieval callback when requesting a frame.
`callBack`	Pointer to `VFilterCallbackProcPtr`, used for retrieving frames (or fields, for interlaced video) from source clips.
`bottleNecks`	Pointer to Premiere's bottleRec functions.
`version`	Version of this structure (`kVideoFilterVersion`). Premiere Pro CS5 = `VIDEO_FILTER_VERSION_11` Premiere Pro CS3 = `VIDEO_FILTER_VERSION_10`
`sizeFlags`	Field-rendering information.
`flags`	If doing a lower-quality render, Premiere will pass in `kEffectFlags_DraftQuality` during *fsExecute*. The filter can then optionally render a faster, lower-quality image for previewing.
`tdb`	Pointer to a time database record describing the sequence timebase.

`instanceData`	Handle to private instance data that persists across invocations. Allocate the memory for this during *fsExecute* and deallocate during *fsDisposeData*. Do not use this field during fsSetup.
`piSuites`	Pointer to callback `piSuites`.
`timelineData`	Only available during *fsInitSpec* and *fsSetup*. This opaque handle to the timeline database is required by `timelineFuncs` callbacks available in `piSuites`. This handle is useful in order to have a preview in a modal setup dialog during *fsSetup*.
`altName`	Unused.
`pixelFormatSupported`	Only valid during *fsGetPixelFormatsSupported*. Return pixel type supported.
`pixelFormatIndex`	Only valid during *fsGetPixelFormatsSupported*. Index of fourCC of pixel type supported.
`instanceID`	The runtime instance ID uniquely identifies filters during a session. This is the same ID that is passed to players in `prtFilterRec`.
`tdbTimelineLocation`	A time database record describing the location of the filter in sequence. Only valid during *fsInitSpec* and *fsSetup*.
`sessionPluginID`	This ID should be used in the File Registration Suite for registering external files (such as textures, logos, etc) that are used by a plug-in instance but do not appear as footage in the Project Panel. Registered files will be taken into account when trimming or copying a project using the Project Manager.

VFilterCallBackProcPtr

Pointer to a callback for retrieving frames (or fields, for interlaced video) from the source clip. Do not expect real-time performance from this callback.

```
typedef short (CALLBACK *VFilterCallBackProcPtr)(
     csSDK_int32    frame;
     PPixHand       thePort;
     RECT *         theBox;
     Handle         privateData);
```

Parameter	Description
`frame`	Frame requested. The frame value passed in should be frame * `samplesize`. The callback will always return the current field (upper or lower) during field rendering.
`thePort`	`PPixHand` where Premiere will store the frame

`theBox`	Bounds of the frame you want Premiere to retrieve.
`privateData`	`Handle` provided by Premiere in `VideoRecord.privateData`

sizeFlags

For `sizeFlags`, the following bit flags are of interest:

Flag	Description
gvFieldsEven	The video filter should render upper-field dominance
gvFieldsOdd	The video filter should render lower-field dominance
gvFieldsFirst	The video filter is currently rendering the dominant field

Additional Details

Fields and Field Processing

In an interlaced project, Premiere calls your video filter once per field. This allows video filters to have interlaced motion. `(*theData)->total` will be twice as large, each frame will be half-height, and rowbytes will double.

Respect the value of `rowbytes` when traversing data or the output will be incorrect.

Frame Caching

The rendered output of video filters is stored in the host media cache. For example, when the user scrubs over a frame with a filter on it, the filter will be called to render its effect on the frame and return the buffer to Premiere. Premiere caches the returned frame, so when the user scrubs over the same frame, Premiere will return the cached frame without having to call the filter again. If the user has modified the filter settings, the clip settings, the preview quality, etc, Premiere will call the filter to render with the new settings, but will keep the previously cache frame for a while. So if the changes are reversed, Premiere may still have the cached frame to return when appropriate.

If the filter should generate random, non-deterministic output, or if it changes over time without keyframes, the randomness bit must be set in the `ANIM_FilterInfo` section in the PiPL (.r file). If you set the bit to `noRandomness`, Premiere will only render one frame of a still image.

Creating Effect Presets

Effect presets appear in the Presets bin in the Effects panel, and can be applied just like Effects with specific parameter settings and keyframes. Effect presets can be created as follows:

1) Apply a filter to a clip
2) Set the parameters of the filter, adding keyframes if desired
3) Right-click on the filter name in the Effect Controls panel, and select "Save Preset..."
4) Create preset bins if desired by right-clicking in the Effects panel and choosing "New Presets Bin"
5) Organize the presets in the preset folders
6) Select the bins and/or presets you wish to export, right-click, and choose "Export Preset"

On Windows, newly created presets are saved in the hidden Application Data folder of the user's Documents and Settings (e.g. C:\Documents and Settings\[user]\Application Data\Adobe\Premiere Pro\[version]\Effect Presets and Custom Items.prfpset). On Mac OS, they are in the user folder, at ~/Library/Application Support/Adobe/Premiere Pro/[version]/Effect Presets and Custom Items.prfpset.

Effect Presets should be installed as described in the section, "Plug-in Installation". Once they are installed in that folder, they will be read-only, and the user will not be able to move them to a different folder or change their names. User-created presets will be modifiable.

Effect Badging

Starting in CS5, video filters now appear with badges in the Effects panel to advertise if they support YUV, 32-bit, and/or accelerated rendering. The user can filter the list of effects to show only the effects that support those rendering modes. Video filters will automatically receive YUV and 32-bit badges if they advertise support using the existing *fsGetPixelFormatsSupported*. Custom badges can also be created.

To add your own effect badge, go to the following folder:
On Windows: `[App installation path]\Settings\BadgeIcons\`
On Mac OS: `Adobe Premiere Pro CS5.app/Contents/Settings/BadgeIcons/`
In that folder are the PNG graphics that are loaded at runtime for various badges, and an additional set of '`Sample-*.png`' and '`Sample.xml`' files.

1) Make copies of the `Sample-*.png` files, replacing the "Sample" prefix with the prefix that matches whatever you want to call the new badge (like '`NewBadge-*.png`'). Edit the PNG as you'd like, but don't change the image dimensions.
2) Copy the `Sample.xml` file to a new name that matches whatever you want to call the new badge (like '`NewBadge.xml`'). Edit the list of match names that you want to be decorated with your badge. Change the `<Name>` tag to the name you chose in step 1 (like '`NewBadge`'). You can also add your tooltip text as the `<DescriptionItem>` tags. These tags act as a localiza-

tion map with the langid as the key. If a language isn't found, '`en_US`' is used by default. Provide your own GUID in the `<Guid>` tag.
3) Relaunch the application. You'll get a badge filter icon next to the others and a badge icons next to each effect that was listed in the XML file.

Note: '`Sample`' is a special case that is intentionally excluded. Any other set of `*.xml/*.png` files will be used.

Premiere Elements and Effect Thumbnail Previews

Premiere Elements (but not Premiere Pro) displays visual icons for each effect. You will need to provide icons for your effects, or else an empty black icon will be shown for your effects, or even worse behavior in Premiere Elements 8. The icons are 60x45 PNG files, and are placed here:

[Program Files]\Adobe\Adobe Premiere Elements [version]\Plug-ins\Common\EffectPreviews\

The filename should be the match name of the effect, which you specify in the PiPL, prefixed with "PR." So if the match name was "MatchName", then the filename should be "PR.MatchName.png"

11

GPU Effects & Transitions

This chapter describes the additional capabilities available to effects and transitions for GPU interoperability with Premiere Pro. The GPU extensions allow these plug-ins to have full access to GPU-resident frames without readback to system memory, when using the Mercury Playback Engine in a GPU-accelerated mode. Effects and transitions can also optionally tell the host that they support real-time processing, so that they will not be flagged as non-realtime.

The GPU extensions work on top of effects and transitions built using the After Effects SDK. The extensions are designed to supplement a regular software effect or transition, which defines the software rendering path, parameters, custom UI drawing, and other standard interaction. The GPU effect exists as a new entry point for rendering using the GPU if possible. The software render path will be used otherwise.

System Requirements

The system requirements for developing GPU effects & transitions are higher than developing other plug-ins. You'll need a video card that supports Mercury Playback Engine GPU-acceleration. Make sure your video card supports the type of video acceleration you are developing, on the platform you are developing on. See this page for the latest supported video cards:
https://helpx.adobe.com/premiere-pro/system-requirements.html
The CUDA SDK is also needed for CUDA rendering development.

CUDA, OpenCL, Metal, or OpenGL?

The GPU architecture of Premiere Pro is entirely CUDA/OpenCL/Metal, and this is what is exposed through the GPU extensions to the effect/transition APIs. A GPU-accelerated effect may use any combination of CUDA, OpenCL, and Metal.

If you want, you have the ability to transfer frames from CUDA/OpenCL to OpenGL (though not always efficiently). Read more about that here.

What’s New in Premiere Pro 12.0?

GPU effects and transitions built using this SDK can now be compatible with After Effects 15.0 and later. The sample GPU effect projects have been updated so that they load in both Premiere Pro and After Effects.

The newly provided PrGPU SDK macros and device functions allow you to write kernels that will compile on multiple GPU compute languages - OpenCL, CUDA, and Metal.

What’s New in Premiere Pro CC 2015.4?

GPU-accelerated rendering using Metal is now supported for third-party effects and transitions. `PrGPUDeviceFramework_Metal` has been added as one of the enum values in `PrGPUDeviceFramework`.

What’s New in Premiere Pro CC 2014?

OpenCL rendering now also uses the half-precision 16-bit floating point pixel format for rendering. GPU effects and transitions that support OpenCL should implement both 16f and 32f rendering.

Getting Started

Setting up the Sample Projects

If you are developing an effect, begin with one of the two GPU effect sample projects, progressively replacing its functionality with your own. Refer to chapter 1 for general instructions on how to build the SDK projects.

In addition to those general instructions, the sample project is also dependent on the After Effects plug-in SDK. Download it here. On Windows, create an environment variable pointing to it named `AE_SDK_BASE_PATH`, so that the compiler will find the AE headers that the project includes. On macOS, in *Xcode* > *Preferences* > *Locations* > *Source Trees*, specify `AE_SDK_BASE_PATH` to be the root folder of the AE plug-in SDK you have downloaded and unzipped.

The samples also use Boost, which may be downloaded at boost.org. Download that, and create a variable named `BOOST_BASE_PATH` just as you did with `AE_SDK_BASE_PATH` above.

Finally, install Python, if you do not have it already. It may be downloaded at python.org. The sample projects use this as part of the custom build steps.

Depending on whether your effect will use OpenCL or CUDA or both, you'll need to download the CUDA SDK. On Windows, create an environment variable pointing to it named `CUDA_SDK_BASE_PATH`, so that the linker will find the right libraries.

Querying for Parameters and other Attributes of a Effect or Transition

You'll notice that PrGPUFilterRenderParams has some attributes about an effect or transition, but many things, such as the parameters or duration of the clip to which the plug-in is applied, are not found in that structure. These attributes will need to be queried using the `GetParam()` and `GetProperty()` helper functions in PrGPUFilterModule.h. For example:

```
GetProperty(kVideoSegmentProperty_Effect_EffectDuration,
            duration);
GetProperty(kVideoSegmentProperty_Transition_TransitionDuration,
            duration);
```

Lifetime of a GPU Effect / Transition

A new GPU effect instance is created when an effect/transition is applied in the timeline, or when an effect parameter is changed. When rendering a series of frames it won't needlessly be recreated. The Opaque Effect Data suite should be used to share unflattened sequence data between instances of the same effect on a track item.

Fallback to Software Rendering

When a new GPU effect instance is created, the instance has the option of opting-in or out of providing GPU rendering. The GPU effect should be reasonably sure it has sufficient resources to complete the render if it opts-in, because there is no API support to fall back to software rendering in the middle of a render.

Calling `GetDeviceInfo()` in the GPU Device Suite, and checking `outDeviceInfo.outMeetsMinimumRequirementsForAcceleration`, you can see if supports the minimum system requirements for acceleration. Do not proceed with `AcquireExclusiveDeviceAccess()`, if the minimum requirements are not met.

In emergency situations, when there is not enough GPU memory available to complete a render, an effect may call `PurgeDeviceMemory` in the GPU Device Suite to free up memory not initially available. This will impact performance, and should be used only if absolutely necessary.

OpenGL Interoperability

If you want, you have the ability to transfer frames from CUDA/OpenCL to OpenGL (though not always efficiently).

In Premiere Pro, OpenCL contexts are created with OpenGL interoperability. We expose info about it through `PrGPUDeviceInfo` available through PrSDKGPUDeviceSuite.h:

```
void* outOffscreenOpenGLContextHandle; // CGLContextObj or HGLRC
void* outOffscreenOpenGLDeviceHandle; // HDC
```

For CUDA interoperability with OpenGL:

CUDA -> OpenGL: Create an OpenGL buffer, map it into CUDA with cuGraphicsMapResources, get the mapped address with cuGraphicsResourceGetMappedPointer, copy from the CUDA address to the mapped address with cuMemcpyDtoDAsync, unmap with cuGraphicsUnmapResources.

OpenGL -> CUDA: Map the OpenGL buffer into CUDA with cuGraphicsMapResources, get the mapped address with cuGraphicsResourceGetMappedPointer, copy from the mapped address to CUDA with cuMemcpyDtoDAsync, unmap with cuGraphicsUnmapResources.

Note that on the Mac there is no real OpenGL/CUDA interoperability, and these calls will go through system memory.

Entry Point

The GPU entry point function will only be called if the current project is using GPU acceleration. Otherwise, the normal entry point function will be called as described in the After Effects SDK, or transitions or video filters chapters in this SDK Guide.

Make sure GPU acceleration is activated in File > Project Settings > General > Video Rendering and Playback > Renderer. If a GPU option is not available, then you will need to install a suitable video card in your system.

```
prSuiteError xGPUFilterEntry (
     csSDK_uint32        inHostInterfaceVersion,
     csSDK_int32*        ioIndex,
     prBool              inStartup,
     piSuitesPtr         piSuites,
     PrGPUFilter*        outFilter,
     PrGPUFilterInfo*    outFilterInfo)
```

If *inStartup* is non-zero, the effect/transition should startup and initialize the functions needed to implement `PrGPUFilter`, as well as the info in `PrGPUFilterInfo`. If *inStartup* is false, then the effect/transition should shutdown, unloading any resources it loaded on startup.

As of CC, `inHostInterfaceVersion` is PrSDKGPUFilterInterfaceVersion1 == 1.

If a single plug-in supports multiple effects, increment `ioIndex` to the next value before returning, in order to be called again to describe the next effect.

PrGPUFilter Function Table

PrGPUFilter is a structure consisting of the following functions that a effect/transition can implement.

Selector	Description
`CreateInstance`	Allocate and initialize any GPU resources.
`DisposeInstance`	Release GPU resources.
`GetFrameDependencies`	(optional) If the rendered result of the effect/transition depends on frames other than the input frame, specify these here.
`PreCompute`	(optional) Precompute.
`Render`	Render.

Function Descriptions

CreateInstance

```
prSuiteError (*CreateInstance)(
     PrGPUFilterInstance* ioInstanceData);
```

Creates a GPU filter instance representing an effect or transition on a track item. Returning an error from `CreateInstance` will cause this node to be rendered in software for the current set of parameters. Unlike software instances of effects and transitions, GPU instances are created and disposed whenever an effect parameter changes. This allows an effect have more flexibility about opting-in for GPU rendering, depending on the parameters. Separate instances may be called concurrently.

DisposeInstance

```
prSuiteError (*DisposeInstance)(
     PrGPUFilterInstance* ioInstanceData);
```

Cleanup any resources allocated during `CreateInstance`.

GetFrameDependencies

```
prSuiteError (*GetFrameDependencies)(
     PrGPUFilterInstance*              inInstanceData,
     const PrGPUFilterRenderParams*    inRenderParams,
     csSDK_int32*                      ioQueryIndex,
     PrGPUFilterFrameDependency*       outFrameDependencies);
```

Return dependency information about a render, or nothing if only the current frame is required. Increment `ioQueryIndex` for additional dependencies.

PreCompute

```
prSuiteError (*Precompute)(
     PrGPUFilterInstance*              inInstanceData,
     const PrGPUFilterRenderParams*    inRenderParams,
     csSDK_int32                       inIndex,
     PPixHand                          inFrame);
```

Precompute a result into preallocated uninitialized host (pinned) memory. Will only be called if `PrGPUDependency_Precompute` was returned from `GetFrameDependencies`. Precomputation may be called ahead of render time. Results will be uploaded to the GPU by the host. If `outPrecomputePixelFormat` is not custom, frames will be converted to the GPU pixel format.

Render

```
prSuiteError (*Render)(
     PrGPUFilterInstance*              inInstanceData,
     const PrGPUFilterRenderParams*    inRenderParams,
     const PPixHand*                   inFrames,
     csSDK_size_t                      inFrameCount,
     PPixHand*                         outFrame);
```

Render into an allocated outFrame allocated with PrSDKGPUDeviceSuite or operate in place.

Result must be in the same pixel format as the input. If the effect grows or shrinks the output area (e.g. rendering a drop shadow), it is allowable for the effect to allocate and return a different sized `outFrame`.

For effects, `inFrames[0]` will always be the frame at the current time, other input frames will be in the same order as returned from `GetFrameDependencies`. For transitions `in-Frames[0]` will be the incoming frame and `inFrames[1]` the outgoing frame. Transitions may not have other frame dependencies.

Use the utility function `GetParam` to retrieve the parameter values at the current time.

Return Codes

Return Code	Reason
`malNoError`	No error.
`malUnknownError`	Error.

Structure Descriptions

PrGPUFilterInfo

This structure contains some basic info about a GPU filter. It provides access to various suites, and access to private data where the instance can allocate memory and store data which will be passed to subsequent functions.

```
typedef struct {
     csSDK_uint32   outInterfaceVersion;
     PrSDKString    outMatchName;
} PrGPUFilterInfo;
```

Member	Description
`outInterfaceVersion`	Set to the GPU API version corresponding to the version defined in the SDK you are using.

`outMatchName`	`outMatchName` must be equal to a registered software filter, if NULL will default to the module's PiPL.

PrGPUFilterInstance

This structure contains some basic info about a GPU filter. It provides access to various suites, and access to private data where the instance can allocate memory and store data which will be passed to subsequent functions.

```
typedef struct {
     piSuitesPtr    piSuites;
     csSDK_uint32   inDeviceIndex;
     PrTimelineID   inTimelineID;
     csSDK_int32    inNodeID;
     void*          ioPrivatePluginData;
     prBool         outIsRealtime;
} PrGPUFilterInstance;
```

Member	Description
`piSuites`	Standard suites.
`inDeviceIndex`	For use with PrSDKGPUDeviceSuite.
`inTimelineID`	For use with PrSDKVideoSegmentSuite.
`inNodeID`	For use with PrSDKVideoSegmentSuite.
`ioPrivatePluginData`	Used by a plug-in to store instance data, never touched by the host.
`outIsRealtime`	Specify if the plug-in is likely to play in real-time, used to determine whether the segment is red, yellow, or unmarked in the timeline.

PrGPUFilterRenderParams

This structure describes the current render request.

```
typedef struct {
     PrTime inClipTime;
     PrTime inSequenceTime;

     // Render properties
     PrRenderQuality inQuality;
     float inDownsampleFactorX;
     float inDownsampleFactorY;

     // Frame properties
     csSDK_uint32 inRenderWidth;
     csSDK_uint32 inRenderHeight;
     csSDK_uint32 inRenderPARNum;
     csSDK_uint32 inRenderPARDen;
     prFieldType inRenderFieldType;
     PrTime inRenderTicksPerFrame;

     pmFieldDisplay inRenderField;
} PrGPUFilterRenderParams;
```

Member	Description
`inClipTime`	The time of the current render, relative to clip start
`inSequenceTime`	The time of the current render, relative to sequence start
`inQuality`	Render quality; one of the PrRenderQuality enum values
`inDownsampleFactorX`	Horizontal downsample factor
`inDownsampleFactorY`	Vertical downsample factor
`inRenderWidth`	Video resolution
`inRenderHeight`	
`inRenderPARNum`	Video pixel aspect ratio, described as a fractional number with separate values for numerator and denominator.
`inRenderPARDen`	
`inRenderFieldType`	Render field type
`inRenderTicksPerFrame`	Video frame rate
`inRenderField`	GPU rendering is always done on full-height progressive frames unless `PrGPUFilterFrameDependency.outNeedsFieldSeparation` is false. `inRenderField` indicates which field is being rendered.

PrGPUFilterFrameDependency

This structure describes any dependencies for a rendered frame.

```
typedef struct {
     PrGPUFilterFrameDependencyType outDependencyType;

     // Dependence on other frame times
     csSDK_int32 outTrackID;
     PrTime outSequenceTime;

     // Dependence on precomputation phase
     PrPixelFormat outPrecomputePixelFormat;
     csSDK_uint32 outPrecomputeFrameWidth;
     csSDK_uint32 outPrecomputeFrameHeight;
     csSDK_uint32 outPrecomputeFramePARNumerator;
     csSDK_uint32 outPrecomputeFramePARDenominator;
     prFieldType outPrecomputeFrameFieldType;
     csSDK_size_t outPrecomputeCustomDataSize;

     prBool outNeedsFieldSeparation;
} PrGPUFilterFrameDependency;
```

Member	Description
`outDependencyType`	The dependency type. Could be either: `PrGPUDependency_InputFrame`, `PrGPUDependency_Precompute`, or `PrGPUDependency_FieldSeparation`
`outTrackID`	Specify which track is a dependency. Set to 0 for the current track
`outSequenceTime`	Set the sequence time which is a dependency.
`outPrecomputePixelFormat`	Dependence on precomputation phase
`outPrecomputeFrameWidth`	
`outPrecomputeFrameHeight`	
`outPrecomputeFramePARNumerator`	
`outPrecomputeFramePARDenominator`	
`outPrecomputeFrameFieldType`	
`outPrecomputeCustomDataSize`	Only needed if `outPrecomputePixelFormat` is custom
`outNeedsFieldSeparation`	Indicates if the plug-in may operate on both fields simultaneously (eg non-spatial and non-time varying)

PrGPU SDK Macros

The PrGPU SDK macros and device functions allow you to write kernels that will compile on multiple GPU compute languages - CUDA, OpenCL, and Metal. These languages have an enormous overlap - a C98 language subset, and by using the porting macros and functions to abstract out the differences, you can write portable code. You can still access API specific features not covered by the porting set but you'll need to include an alternate code path for the other APIs.

Currently the SDK does not provide host side code to compile or launch arbitrary kernels, but there are SDK examples that show how to do this for the different APIs.

The macros are not part of the plug-in API - they are provided as a utility if you would like to used them. This gives you broad latitude to fork them and make any changes you see fit without breaking plug-in compatibility. On the Adobe end, we may expand and modify the SDK kernel porting set in future releases to cover other compute APIs or other enhancements.

External Dependencies

The macros do add one external source dependency - Boost (boost.org). We use the Boost preprocessor package to manipulate kernel definitions.

Depending on how you choose to compile and deploy your kernels, we also provide a small python script that may be useful (See "Preprocessing as a Separate Step")

Include Paths

You need to add some include paths to your kernel compilation environment:

- the path to PrGPU/KernelSupport/ (found in the SDK at Examples/Projects/GPUVideoFilter/Utils/)
- the path to the Boost library

Defines

You will also need to define a symbol to tell the header file what API to process when compiling the kernel:

- Metal: `-DGF_DEVICE_TARGET_METAL=1`
- OpenCL:
    - `-DGF_DEVICE_TARGET_OPENCL=1`
    - `-DGF_OPENCL_SUPPORTS_16F=1` or `0`, depending on whether you will support half (16-bit float) access for this device. Some older cards are quite slow at half support, or just don't support it.
- CUDA: the KernelCore.h header will automatically sense the cuda compiler and will `#define GF_DEVICE_TARGET_CUDA 1` for you.

Only one device target flag will be active in any given compilation. The header the define the device target macros to 0 for the inactive APIs. Feel free to use these macros in your code for any API specializations. Outside of the header, we don't need to do this much.

Header Files

- KernelCore.h - basic header macros. You'll certainly want these
- KernelMemory.h - global device memory access abstractions for float and half
- FloatingPoint.h - common floating point routines. These mostly hide naming differences across APIs.

You'll want to include them like this in your kernel:
`#include "PrGPU/KernelSupport/KernelCore.h"`

The folder contains additional files used by the above files.
One thing to watch out for is whether your projects are tracking header dependencies properly. If not, you'll need to manually recompile kernels when include files change. This is true whether or not you use the SDK porting set, so you've likely already sorted this out.

Top Level Kernel Files

You can organize your code and projects as you like, but we find it convenient to have separate top level kernel files for each API (.cl, .cu, and .metal) that just include shared code and are otherwise nearly empty. This makes build rules much easier.

Preprocessing as a Separate Step

If you compile the kernel source on the customer machine, you may wish to preprocess the kernel at plug-in compile time, and store the kernel source in your plug-in. A python script is provided that will convert preprocessed source to a character array. The script is in Examples/Projects/GPUVideoFilter/Utils/CreateCString.py. See the ProcAmp example for usage.

You can also compile kernels (which is always the case for CUDA) at plug-in compile time, in which case you don't need the python script, or a separate preprocessing run. You will need to package the compiled kernel in your plug-in if you go this route.

The ProcAmp plug-in example uses a preprocessing step for OpenCL and Metal.

Declaring Kernels

Metal kernels require syntax that is quite different than OpenCL or CUDA, and the PrGPU macros use the Boost preprocessing package to express parameters. This is by far the most complicated part of the package, so grab a fresh cup of coffee and sit back for a read.

The GF_KERNEL_FUNCTION macro is used to pass values as parameters (OpenCL/CUDA) or in a struct (metal). The macro will create an API-specific kernel entry point which will call a function that it defines, leaving you to fill in the body. The macro uses Boost preprocessor sequences to express a type/name pair:

```
(float)(inValue)
```

These pairs are then nested into a sequence of parameters:

```
((float)(inAge))((int)(inMarbles))
```

There are different categories of parameters, such as buffers, values, and kernel position. Each category sequence is a separate macro parameter. Example usage:

```
 GF_KERNEL_FUNCTION(RemoveFlicker, //kernel name, then comma,

   ((GF_PTR(float4))(inSrc))
     //all buffers and textures go after the first comma
   ((GF_PTR(float4))(outDest)),

   ((int)(inDestPitch))
     //After the second comma, all values to be passed
   ((DevicePixelFormat)(inDeviceFormat))
   ((int)(inWidth))
   ((int)(inHeight)),

   ((uint2)(inXY)(KERNEL_XY))
     //After the third comma, the position arguments.
   ((uint2)(inBlockID)(BLOCK_ID)))

 {
   <do something interesting here>
 }
```

In the example above, the host does not pass the position values when invoking the kernel.

Position values are filled in automatically by the unmarshalling code generated by the `GF_KERNEL_FUNCTION` macro. The code you write will actually end up in a device function that the unmarshalling code will call. See the ProcAmp example plug-in for usage.

Kernels that use statically sized shared memory use a different macro, `GF_KERNEL_FUNCTION_SHARED`. Please see the header for details.

Declaring Device Functions

By comparison, device functions are a snap to write:

```
GF_DEVICE_FUNCTION float Average(float a, float b) {...
```

Other Macros and Functions

There's a variety of other macros and functions in the KernelSupport headers. Please see the Headers and examples for details.

Suites

For information on how to acquire and manage suites, see the SweetPea Suites section in the Universals chapter.

GPU Device Suite

This suite provides info on any GPU devices available. For example, `GetDeviceInfo()` allows an effect/transition to see if the device supports OpenCL or CUDA.

Use this suite to get exclusive access to a device using `AcquireExclusiveDeviceAccess` and `ReleaseExclusiveDeviceAccess`. If needed, you can reconcile devices using the `outDeviceHandle` passed back from `GetDeviceInfo()`.

Device memory should ideally be allocated through this suite. In some cases you may find it more efficient to use a texture / image object as the source. With CUDA, you can bind a texture reference to an existing linear buffer. With OpenCL, you can create an image object from an existing 2D buffer object using image_2d_from_buffer. Temporary allocations are also fine but may be rather slow.

Opaque Effect Data Suite

This suite provides effects a way to share unflattened sequence data between instances of the same effect on a track item. The data is opaque to the host and effects are responsible for maintaining thread safety of the shared data. The host provides reference-counting that the effect can use to manage the lifetime of the shared data. Here's an overview of how this suite should be used:

When the effect is applied, in *PF_Cmd_SEQUENCE_SETUP*, the effect plug-in allocates and initializes the sequence data in `PF_OutData->out_data`. Then it calls `AcquireOpaqueEffectData()`. The opaque effect data does not yet exist, so the plug-in allocates it, and calls `RegisterOpaqueEffectData`, and then copies over the data from the sequence data. So both sequence data and opaque effect data are allocated.

Then *PF_Cmd_SEQUENCE_RESETUP* is called (multiple times) for clones of the effect used for rendering. The effect instance knows it's a clone because the `PF_InData->sequence_data` is `NULL` (there is a special case if the effect has Opaque Effect Data – in that case, its render clones will receive *PF_Cmd_SEQUENCE_RESETUP* with a NULL sequence_data pointer). It then calls `AcquireOpaqueEffectData()`. As a render clone, it relies on this opaque effect data, rather than sequence data, and does not try to copy the sequence data to opaque effect data.

When, on the other hand, *SEQUENCE_RESETUP* is called with valid sequence_data in `PF_InData`, this is not a render clone. The plug-in unflattens this sequence data. It then calls `AcquireOpaqueEffectData()`, and if the opaque effect data does not yet exist (i.e. when reopening a saved project), the plug-in allocates it, and calls `RegisterOpaqueEffectData`. It then copies the sequence data to opaque effect data.

On *SEQUENCE_FLATTEN*, the plug-in takes the unflattened data, flattens it, and disposes of the un-flat data.

When *SEQUENCE_SETDOWN* is called (it may be called multiple times to dispose of render clones), `ReleaseOpaqueEffectData()` is called.

instanceID

The Opaque Effect Data Suite functions need the instanceID of the effect. For the software entry point, you can obtain this using `GetFilterInstanceID()` in PF_UtilitySuite, defined in PrSDKAESupport.h. For the GPU Render entry point, you can use the following code:

```
csSDK_uint32 instanceID;
GetProperty(    kVideoSegmentProperty_Effect_RuntimeInstanceID,
                instanceID);
```

...where `GetProperty()` is defined in PrGPUFilterModule.h, and the `kVideoSegmentProperty_*` IDs are defined in PrSDKVideoSegmentProperties.h.

12 AE Transition Extensions

This chapter describes how to build native transitions in Premiere Pro based on the After Effects API. From a user-perspective, plug-ins built this way can show their parameters directly in the Effect Controls panel, even providing custom parameter UI in that panel or in the Sequence Monitor. Such plug-ins can run not only in Premiere Pro, but also in After Effects, although they will appear as effects rather than transitions.

The transition extensions work on top of effects built using the After Effects SDK. Since AE effects only have a single input, the second input is a layer parameter defined by the plug-in.

PF_TransitionSuite

In PrSDKAESupport.h, we've added `PF_TransitionSuite::RegisterTransitionInputParam()`. This call must be made before the PF_ADD_PARAM() call during PF_Cmd_PARAM_SETUP. Pass in the param to be used as the input layer for the other side of the transition. This enables you effect to be applied between two clips in the timeline just like our native transitions, but it will show up in the Effect Controls panel with full keyframable parameters similar to existing AE effects.

Getting Started

Setting up the Sample Project

If you are developing an transition, begin with the sample project, named SDK_CrossDissolve, progressively replacing its functionality with your own. Refer to chapter 1 for general instructions on how to build the SDK projects.

In addition to those general instructions, the sample project is also dependent on the After Effects SDK. Download it here. On Windows, create an environment variable pointing to it named "AE_SDK_BASE_PATH", so that the compiler will find the AE headers that the project includes. On

MacOS, in XCode > Preferences > Locations > Source Trees, specify AE_SDK_BASE_PATH to be the root folder of the AE SDK you have downloaded and unzipped.

Depending on whether your transition will use OpenCL or CUDA or both, you'll need to download the CUDA SDK. On Windows, create an environment variable pointing to it named "CUDA_SDK_BASE_PATH", so that the linker will find the right libraries.

Compatibility Considerations

For compatibility with plug-in hosts that doesn't support the AE Transition Extensions, a plug-in should check first for the existence of the suite. If it isn't available, the plug-in should act as a normal effect. This is demonstrated in the SDK_CrossDissolve sample project.

13 Device Controllers

Device controllers drive hardware devices, such as cameras and tape decks, enabling timecode-accurate, hardware-assisted video capture and output to tape. Device controllers are used when working in the Capture and Edit to Tape panels. A device controller can implement one or more communication protocols, and should gracefully handle differences across various hardware that support the same protocol.

Device controllers are usually called by Premiere when the user is in the Capture panel or Edit to Tape panel, for example, when using the VTR transport controls in either panel to navigate through video on a VTR. But device controllers can also be driven by recorder plug-ins during capture. Especially when capturing video, the device controller's operation becomes deeply intertwined with the recorder. Device controllers work along with recorders to update Premiere with timecode information from the hardware.

If you've never developed a device controller before, you can skip the What's New section, and go directly to Getting Started.

What's New?

What's New in CC October 2013

The new command *cmdSetDeviceHandler* was added. This command tells the device controller which panel is using the device controller -- either the Capture panel, or Export to Tape panel.

What's New in CC July 2013?

In the July 2013 release of CC, the new capability flag `fCanPrintToTape` was added for a device controller supporting Edit to Tape using the new panel to specify whether or not it supports Print to Tape mode. `fCanDelayMovieStart` was added for a device controller to optionally specify that it wants to handle Delay Movie Start on its own. If the flag is set, the value as set by the user will be passed in `DeviceRec.delayFrames` during an Edit to Tape. The DeviceRec. version has been incremented to `kDeviceControlAPIVersion13` for plug-ins to distinguish which version they are running in.

What's New in CC?

In CC, the new Edit to Tape panel provides an integrated UI with settings and controls for exporting a clip or sequence to tape. The device controller can optionally support various common settings in the Edit to Tape panel. Three types of record modes are now natively supported: Print to Tape, Insert, and Assemble modes. Although a device controller can still provide a custom setup dialog for any additional settings, the panel eliminates much of the need for custom UI. It also allows for integrated device presets, and some bonus capabilities like adding Bars and Tone / Black Video / Universal Counting Leader to the start of the edit to tape. To update your device controller to use the new panel, set `fCanInsertNoUI` along with any other flags during `dsExecute`/ `cmdGetFeatures`. Then take your *cmdInsertEdit* implementation and integrate your logic to respond to the new record modes sent in *cmdNewMode*.

What's New in CS6.0.1?

In CS6.0.1, `DroppedFrameProc` was added to give device controllers a way to get the number of frames dropped during an insert edit. A device controller can use this to provide the feature to abort an Export to Tape if frames are dropped. This method is already superceded by the new Edit to Tape panel functionality in CC.

Getting Started

You'll need a thorough understanding of the device(s) you hope to control before developing a device control plug-in. Begin with the sample project, progressively replacing its functions with your own. Will your device controller be used for the capture process, or for output to tape, or both? Below are notes describing how to support these in your plug-in.

Resources

Device controllers use a basic PiPL to specify their name and the match name that Premiere uses to identify them. When making changes to the PiPL resource, rebuild the plug-in each time, so that the PiPL will be recompiled.

Entry Point

```
short xDevice (
     short          selector,
     DeviceHand     theData)
```

selector is the action Premiere wants the device controller to perform. DeviceHand is a handle to `DeviceRec`, which provides all pertinent information. Return `dmNoError` if successful, or an appropriate return code.

Capture

Timecode

Since the device controller and recorder sample plug-ins both only simulate hardware, they will return different timecode values to the app. You can set the Capture panel to only display device controller timecode by going to Preferences > Capture, and check "Use device control timecode". On the other hand, leaving this box unchecked and observing the different timecodes returned is a good way to get a feel for when the device controller timecode is used, and when the recorder timecode is used.

Preroll Time

The Preroll Time value is set in the Capture panel, in the Settings tab. The value defaults to zero seconds, but it may be set to any positive value chosen by the user. Adjusting the Preroll Time setting will have an effect on the `DeviceRec.preroll` value sent during *dsExecute/cmdLocate*. The value with be converted from seconds into frames for the device controller.

Timecode Offset

The Timecode Offset value is set in the Capture panel, in the Settings tab. The value defaults to zero frames, but it may be set to any value chosen by the user when they calibrate their VTR to account for any latencies. So when using the same tape in two separate VTRs, to capture the same timecode span, the Timecode Offset may be used to account for any differences in the way the VTRs report timecode back to Premiere. Using the Timecode Offset, the in point sent to the device controller can be shifted earlier or later, while the timecode embedded in the clip after the capture will remain the same.

Adjusting the Timecode Offset setting will be transparent to the device controller, but will have an effect on the `DeviceRec.timecode` value sent during *dsExecute/cmdLocate*. Starting in

CS5.5, a negative Timecode Offset value is acceptable. Note that for In/Out capture, the earliest allowable time for the in point is 2 seconds. If the provided in point is earlier than that, it will be automatically adjusted to start at 2 seconds.

Edit to Tape

Audio Channels

The device controller should specify how many audio channels are supported by the connected device, so that the Edit to Tape panel will only enable valid audio channel controls. During `cmdGetFeatures`, the device controller should set the bits corresponding to the audio channels available on the device in `DeviceRec.exportAudioChannels`.
Then later if performing an Insert Edit, during `modeRecordInsert`, if the device supports audio channel selection, the bits in `exportAudioChannels` will be set by the host corresponding to audio channels to export: A1 == bit 0, A2 == bit 1, etc.

Record

Starting in CC, the Edit to Tape panel provides three types of export modes: Insert, Assemble, and Print to Tape. The device controller should specify if it supports Assemble mode by setting `fCanAssembleEdit` along with any other flags during `dsExecute`/`cmdGetFeatures`.

When the user presses the Record button in the Edit to Tape Panel, Premiere will send *dsExecute*/`cmdNewMode` with either `modeRecord`, `modeRecordInsert`, or `modeRecordAssemble`, depending on the Export Type set in the Edit to Tape panel.

Hitting the Record button with Export Type set to Print to Tape sends `modeRecord`. This record mode is a simple crash record that has no preroll before the in point and causes noticable breaks in the video signal. Setting Assemble sends `modeRecordAssemble`. This mode uses a preroll before the in point for a smooth transition at the in point, but the out point ends the recording abruptly which will leave a noticable break if there is any subsequent video.
Setting Insert sends `modeRecordInsert`. This mode uses a preroll before the in point and also ends the recording at the outpoint without any breaks in the video signal. This is also the only mode that allows for selective replacement of specific video/audio channels.

`DeviceRec.exportFlags` will denote whether video and/or closed captioning should be exported or not, and `DeviceRec.exportAudioChannels` will denote which audio channels to export. `DeviceRec.timecode` provides the in point of the edit to tape operation, and `DeviceRec.preroll` provides the user-specified preroll.

Premiere will play the video output in the Edit to Tape panel. When the record is complete, the device controller should return from *dsExecute*/`cmdNewMode`.

Preview Edits

Starting in CC, the device controller should specify if it supports previewing edits by setting `fCanPreviewEdit` along with any other flags during `dsExecute`/`cmdGetFeatures`. If Preview is supported, the button will be activated in the Edit to Tape panel, and when pressed, the device controller will receive the same messaging as described above when pressing Record, except that `previewEdit` will be set in `DeviceRec.exportFlags`.

Abort on Dropped Frames

New in CC, when using the Edit to Tape panel, this is handled transparently to the device controller. If a transmit plug-in or renderer reports dropped frames, Premiere will stop playback and send *dsExecute*/`modeStop` to the device controller.

In Premiere Pro CS6.0.1, or in CC if the device controller doesn't support the Edit to Tape panel, use the `DroppedFrameProc` callback to query the current number of frames dropped during an insert edit. A device controller can use this to provide the feature to abort an Export to Tape if frames are dropped. It can make the call regularly during Export to Tape, and if the value returned is non-zero, return `dmExportToTapeFinished` to abort playback.

Closed Captioning

When using the Edit to Tape panel, the device controller should specify if it supports Closed Captioning export by setting `fCanUseCC` along with any other flags during `dsExecute`/`cmdGetFeatures`.

If the user checks the Insert Closed Captioning checkbox and chooses Record or Preview, the device controller should use the Captioning Suite to get the captions and send them out with the export.

Selector Table

This table summarizes the various selector commands a device controller can receive.

Selector	Description
dsInit	Create private instance data, and initialize hardware connection.
dsRestart	Restart device controller – used at startup to reconnect to a device.

dsSetup	Display a modal dialog with any user settings and info the device controller wishes to show the user.
dsExecute	Execute a specified device control command. One a device controller has been initialized, most of the various user-driven interactions will be sent as dsExecute selectors with a subcommand.
dsCleanup	Dispose of any allocated data structures.
dsQuiet	Disconnect from the device, but don't dispose of allocated structures.
dsHasOptions	Return `dmHasNoOptions` to disable the device controller options button.

Selector Descriptions

dsInit

This will be sent when the device controller is selected in the UI for the first time, because no device controller private data is stored in the application preferences. When there is already existing private data in the preferences, *dsRestart* will be sent instead. To delete the preferences, hold down Ctrl-Alt-Shift on Win and Ctrl-Opt-Shift on MacOS when launching the app.

Allocate a memory handle to private data, and store the handle in `DeviceRec.deviceData`. Initialize the hardware connection, and choose a default operating mode if more than one is available. A dialog can be presented to prompt the user for settings.

If the connection fails, return `dmDeviceNotFound`. Keep in mind, though, that the host will still send messages to the device controller, in case the hardware comes on-line later.

dsRestart

Reestablish connections to hardware devices. This selector is similar to *dsInit*, but the private instance data, `deviceData`, is already populated. If you have just modified the definition of the private data structure, you can run into problems unless you provide some version checking here. *dsInit* can fall into the *dsRestart* case.

dsSetup

This selector is sent when the user hits the Device Settings button in the Edit to Tape panel, the Options button in the Device Control area of the Capture panel, or the Options button in the Device Control area of the Preferences.

Display a modal dialog with any user settings and info the device controller wishes to show the user. If your device controller doesn't require user input, this selector can be safely ignored, but should return `dmNoErr`. To specify that the Setup button in the device control options should not be shown, respond to *dsHasOptions*.

dsExecute

Perform a device control operation based on the command in the `DeviceRec`. See the Commands section below for detailed descriptions.

dsCleanup

Disconnect from hardware and dispose of the plug-in's private instance data (stored in `device-Data`).

dsQuiet

Like *dsCleanup*; disconnect from the device, but don't dispose of private instance data. dsRestart will be sent to reconnect the device.

dsHasOptions

Return `dmHasNoOptions` to disable the device controller options button.

Return Codes

Return Code	Reason
`dmNoErr`	Operation has completed without error.
`dmDeviceNotFound`	The device is not available.
`dmTimecodeNotFound`	The device cannot read the timecode from the media, or there is none to be read.
`dmBadTimecode`	The device has timecode but it doesn't trust it.
`dmCantRecord`	The device is unable to record to the media.
`dmUserAborted`	The operation has stopped because the user cancelled.
`dmLastErrorSet`	The device controller set the last error string using the Error Suite.
`dmExportToTapeFinished`	The device controller is signaling the end of the export to tape operation.

`dmTapeWriteProtected`	Return value during Export To Tape if tape is write protected.
`dmNoTape`	Return value during Export To Tape if there is no tape in the deck.
`dmLastInfoSet`	The device controller set the last info string using the SweetPea Error Suite.
`dmLastWarningSet`	The device controller set the last warning string using the SweetPea Error Suite.
`dmHasNoOptions`	Return during *dsHasOptions* to disable the device controller options button..
`dmUnknownError`	The device controller set the last error string using the Error Suite.
`dmUnsupported`	The selector is not recognized, or unsupported.
`dmGeneralError`	Unspecified error.

DeviceRec

A device controller is passed a handle to a `DeviceRec` with every selector. Yes, we know, it's a monster.

```
typedef struct {
     PrMemoryHandle           deviceData;
     short                    command;
     short                    mode;
     csSDK_int32              timecode;
     short                    timeformat;
     short                    timerate;
     csSDK_int32              features;
     short                    error;
     short                    preroll;
     CallBackPtr              callback;
     PauseProcPtr             PauseProc;
     ResumeProcPtr            ResumeProc
     long                     xtimecode;
     long                     keycode;
     short                    editmode;
     short                    exteditmode;
     Print2TapeProcPtr        PrintProc;
     HWND                     parentWindow;
     piSuitesPtr              piSuites;
     char*                    displayName;
     TimecodeUpdatePtr        TimecodeUpdateProc;
```

```
    void*                    classID;
    long                     version;
    short                    videoStreamIsDrop;
    short                    autoDetectDropness;
    char*                    currentDeviceIDStr;
    long                     preferredScale;
    unsigned long            preferredSampleSize;
    DroppedFrameCountPtr     DroppedFrameProc;
    csSDK_uint32             exportAudioChannels;
    csSDK_uint16             exportFlags;
    csSDK_int32              delayFrames;
} DeviceRec, *DevicePtr, **DeviceHand;
```

`deviceData`	Handle to private data allocated during *dsInit* or *dsRestart*. Saved in the application preferences, and restored when the app is restarted.
`command`	The command to be performed when you receive *dsExecute*.
`mode`	Used in three ways. For *dsExecute/cmdNewMode*, mode contains your device's new mode. For *dsExecute/cmdStatus*, mode is where you indicate the device's current mode (the last mode reported will still be there). For *dsExecute/cmdShuttle*, mode contains the shuttle rate (-100 to 100).
`timecode`	Used three ways. For *dsExecute/cmdGoto* and *dsExecute/cmdLocate*, the timecode field indicates the timecode to which your should move. For *dsExecute/cmdStatus*, return the deck's current timecode position via the timecode field, where `kInvalidTimecode` will display "N/A" (not available), -2 will blank the timecode display, and -3 will display "Searching…". For *dsExecute/cmdJogTo*, timecode specifies the location to which you should jog.
`timeformat`	Reports the format of timecode for a *dsExecute/cmdStatus*; 0 for non-drop frame, 1 for drop-frame.
`timerate`	Reports the frame rate of timecode for a *dsExecute/cmdStatus* call. Set to 24, 25, 30, or 60. Note, for 23.976 fps footage, set `timerate` to 24, and `timeformat` to 1. 24 fps timecode will be used, as expected. Of course, there is no such thing as 24 fps drop-frame timecode, but this was the way 23.976 fps support was added within the constraints of the existing API.
`features`	Reports the device's features in response to a *dsExecute/cmdGetFeatures* call.
`error`	Set this field to an appropriate error code and return a non-zero value from your device controller.

`preroll`	Used by *dsExecute*/*cmdLocate*. Preroll is how far before (smaller time-code) the seek time specified in timecode you should seek. The pre-roll value is the product of a calibration sequence the user performs.
`callback`	Pointer to a callback to use during *dsExecute*/*cmdLocate* to determine if the user is attempting to abort. `typedef csSDK_int32 (*CallBackPtr) (void);` If the return value is non-zero, the user has attempted to abort.
`PauseProc`	Pointer to a callback that you can use to temporarily pause any sequence grabber operations in a device-controlled window. It is defined as follows: `typedef void (*PauseProcPtr) (void);`

`ResumeProc`	A pointer to a routine to call to resume sequence capture after calling `PauseProc`. Every call to `PauseProc` must be matched by a call to `ResumeProc`.
	
	`typedef void (*ResumeProcPtr) (void);`
	
	Call these routines before putting up an error alert, for instance:
	
	`(*(*theData)->PauseProc)();`
	`// your error handler here`
	`(*(*theData)->ResumeProc)();`
	
	If `PauseProc` isn't called before putting up an alert (or any other dialog), video will be played over it

`xtimecode`	Duration of the movie being exported (used for the Export to Tape).
`keycode`	Unused.

`editmode`	Can be any combination of the following flags to enable user actions:
	
	`insertVideo,`
	`insertAudio1,`
	`insertAudio2,`
	`insertTimeCode,`
	`insertAssemble,`
	`insertPreview`

`exteditmode`	Unused.

`PrintProc`	New in CC, this callback is no longer needed as the host drives the Edit to Tape rather than the device controller.
	
	A pointer to a plug-in function Premiere calls to print to tape.
	
	`csSDK_int32 (*Print2TapeProcPtr)(`
	`     PrMemoryHandle deviceHand,`
	`     long           selector);`
	
	`deviceHand` is passed to the plug-in in `DeviceRec`. selector can be *setupWaitProc*, *idle*, or *complete*.
	
	See *cmdInsertEdit*.

`piSuites`	Pointer to universal callback suites.
`displayName`	A 255 character string to display the name of the device the plug-in is currently controlling.

`TimecodeUpdate-Proc`	During *cmdLocate*, use this to report timecode.
	
	`void (*TimecodeUpdatePtr)(`
	`     csSDK_int32    outTimecode,`
	`     void*          outClassID);`

`classID`	Used for `TimecodeUpdateProc`
`version`	Premiere informs the device controller of the API version, so the plug-in can modify it's behavior to support multiple versions, if de-sired. Premiere Pro CC, October 2013 update - `kDeviceControlAPIVersion14` Premiere Pro CC, July 2013 update - `kDeviceControlAPIVersion13` Premiere Pro CC - `kDeviceControlAPIVersion12` Premiere Pro CS6.0.1 - `kDeviceControlAPIVersion11` Premiere Pro CS5.5 - `kDeviceControlAPIVersion105` Premiere Pro CS5 - `kDeviceControlAPIVersion10` Premiere Pro CS3 and CS4 - `kDeviceControlAPIVersion9`
`videoStreamIs-Drop`	If `autoDetectDropness` was set earlier, and the recorder called `FormatChangedFunc` to provide the drop-frame attribute of the timecode, Premiere will call *cmdSetDropness* and use this to tell the device controller if the video stream is drop-frame.
`autoDetectDrop-ness`	Set this to true if you want Premiere to notify the device controller whether or not the video stream uses drop-frame timecode. Premiere will get this timecode information from the active recorder. The result will be sent during *cmdSetDropness* in `videoStreamIsDrop`.

`current-DeviceIDStr`	For internal use only.
`preferredScale`	The current timebase. Use this rather than calling `piSuites->utilFuncs->getSettings(kSettingsProjectScale)`.
`preferredSample-Size`	New in Premiere Pro CS3. The current timebase. Use this rather than calling `piSuites->utilFuncs->getSettings(kSettingsProjectSampleSize)`.

`DroppedFrameProc`	New in CC, if the Edit to Tape panel is supported, this callback is no longer needed as Abort on Dropped Frames is handled transparently to the device controller. In Premiere Pro CS6.0.1, use this callback to query the current number of frames dropped during an insert edit. A device controller can use this to provide the feature to abort an Edit to Tape if frames are dropped.
	
	`csSDK_int32 (*DroppedFrameProc)(`
	`     void*      inClassID);`

`exportAudio-Channels`	New in CC. During `cmdGetFeatures`, the device controller should set the bits corresponding to the audio channels available on the device. Then later during the record commands, if the device supports audio channel selection, the bits will be set by the host corresponding to audio channels to export: A1 == bit 0, A2 == bit 1, etc.
`exportFlags`	New in CC. During the record commands, one or more of the following may be set: `exportVideo` - set if user has checked the Video checkbox in the Edit to Tape panel `processCCData` - set if user has checked the Insert Closed Caption Data checkbox in the Edit to Tape panel `previewEdit` - set if user has pressed the Preview button in the Edit to Tape panel
`delayFrames`	New in CC July 2013. If `fCanDelayMovieStart` was set, during an Edit to Tape, this will be the value as set by the user (in frames) in the Edit to Tape panel, and Premiere Pro will let the device controller handle the Delay Movie Start.

Commands

When the plug-in receives *dsExecute*, `DeviceRec.command` indicates the behavior requested.

Command	Description
cmdGetFeatures	Fill in the features field with the device's features.
cmdStatus	Return the deck mode and current timecode position.

cmdNewMode	Change the deck's mode.
cmdGoto	Move asynchronously to a particular time and return in pause mode.
cmdLocate	Move synchronously to a particular time and return in play mode.
cmdShuttle	Shuttle the deck at a specified rate.
cmdEject	Eject media.
cmdInsertEdit	No longer needed in CC and later, if the Edit to Tape panel is supported. In previous versions this was sent for Export To Tape. This has been left in for backwards-compatibility.
cmdGetDeviceDisplayName	Provide the device display name for display in the Capture Panel.
cmdSetDropness	Tells the device controller whether the current timecode is drop-frame or non-drop-frame.
cmdGetCurrentDeviceIdentifier	For internal use only.
cmdSetDeviceHandler	New in CC October 2013. Optional. Tells the plug-in which panel is using the device controller -- either the Capture panel, or Export to Tape panel.

cmdGetFeatures

Populate `DeviceRec.features` with the features of your device controller, using the following flags OR'd together in a bit-field:

Flag	Description
`fExportDialog`	The device controller has an export dialog and wishes to control the edit.
`fCanInsertEdit`	No longer needed in CC. In previous versions, this flag would tell Premiere that Insert Edit mode ws supported.
`fDrvrQuiet`	Quiet mode is supported.
`fHasJogMode`	Jog is supported.
`fCanEject`	Media ejection is supported.
`fStepFwd`	Stepping the device forward one frame is supported.
`fStepBack`	Stepping the device backward one frame is supported.
`fRecord`	Your device can record.
`fPositionInfo`	Your device can retrieve position information.
`fGoto`	Your device can seek to a particular frame. You must also set `fPositionInfo`, and respond to *cmdGoto*.
`f1_5`	Your device can play at one-fifth speed.

`fBasic`	Your device supports the basic five deck control operations: stop, play, pause, fast-forward, and rewind.
`fReversePlay`	Your device can play in reverse.
`fCanLocate`	Your device can accurately locate a particular timecode and supports *cmdLocate*. Please do so; cmdLocate is more accurate than *cmdGoto*.
`fCanShuttle`	Your device is capable of variable-speed shuttle operations, forward and backward.
`fNoTransport`	Device supports no transport modes (play, stop, etc).
`fCanAssembleEdit`	New in CC. Set if the device controller supports `modeRecordAssemble`.
`fCanPreviewEdit`	New in CC. Set if `modePreviewRecord` is supported for the Edit to Tape panel.
`fCanInsertNoUI`	New in CC. Set if new Edit to Tape panel is supported. Otherwise, legacy device controllers can continue to function as previously built for CS6 and earlier.
`fCanUseCC`	New in CC. Set if Closed Captioning is supported. This will enable the Insert Closed Captioning Data checkbox in the Edit to Tape panel.
`fCanPrintToTape`	New in CC July 2013. Set to tell Premiere Pro that the device controller supports the "Print to Tape" option in the Export Type popup of the Edit to Tape panel.
`fCanDelay MovieStart`	New in CC July 2013. Set this flag to specify that the device controller wants to handle Delay Movie Start on its own. If the flag is set, the value as set by the user (in frames) in the Edit to Tape panel will be passed in `DeviceRec.delayFrames`, and Premiere Pro will let the device controller handle the delay.

cmdStatus

Premiere sends *cmdStatus* to obtain the deck's current mode (play, pause, etc.) and the current timecode position. Store the device's current mode in mode, and the current timecode value in timecode. Be sure to set `timerate` and `timeformat` as described in `DeviceRec`.

The values of mode and timecode persist. If you only know one of the two pieces of information, store it, and ignore the other. If your device controller makes two calls to determine these values, alternately request one and return the other.

cmdNewMode

Puts the device into a new operating mode, specified in `mode`.

Mode	Description
`modeStop`	Stop.
`modePlay`	Play.
`modePlay1_5`	Play at 1/5 speed.
`modePlay1_10`	Play at 1/10 speed.
`modePause`	Pause.
`modeFastFwd`	Fast forward.
`modeRewind`	Rewind.
`modeRecord`	Record. This is the original record mode for Print to Tape.
`modeGoto`	Go to time specified in `DeviceRec.timecode`.
`modeStepFwd`	Step one frame forward.
`modeStepBack`	Step one frame backward.
`modePlayRev`	Play backward at full speed.
`modePlayRev1_5`	Play backward at 1/5 speed.
`modePlayRev1_10`	Play backward at 1/10 speed.
`modeTapeOut`	No tape is in device.
`modeLocal`	Device is unavailable.
`modeRecordPause`	Pause in record mode.
`modeRecordPlayFastFwd`	Fast forward in play mode.
`modeRecordPlayRewind`	Rewind in play mode.
`modeRecordAssemble`	New in CC. This is selected by the user in the Edit to Tape panel, in the Export Type drop-down.
`modeRecordInsert`	New in CC. This is selected by the user in the Edit to Tape panel, in the Export Type drop-down.

cmdGoto

This is sent, for example, when typing in a new timecode value into the current timecode hot-text control in the lower left hand corner of the Capture panel. It can also be sent when the user chooses Capture In/Out, if the device controller does not support *cmdLocate*.

Begin seeking to the timecode specified by `timecode`. Set up an asynchronous seek, save off the desired timecode in private data, and return immediately with `mode` set to `modeGoto`.

Premiere will then send *cmdStatus* repeatedly, so that you can continue to query the time-code of the device as it moves toward the desired timecode. In `modeGoto`, Premiere will put "Searching…" in the status panel. Later, when the device arrives at the desired timecode, place the device in `modePause` (if you were able to complete the seek) or `modeStop` (if there was an error).

cmdLocate

This is sent, for example, when the user chooses Capture In/Out, if the device controller has set `fCanLocate` during *cmdGetFeatures*.

Seek to an exact frame specified in `DeviceRec.timecode`, minus any amount specified by the Preroll Time, and return immediately with the device in `modePlay`. Unlike *cmdGoto*, which is asynchronous, this is a synchronous operation. Do not return until the operation is complete or an error occurs.

cmdShuttle

Sent when the user moves the shuttle control; mode is the shuttle speed:

Use intermediate speeds if the device supports them. If it doesn't implement shuttling but does support multiple play speeds, Premiere will simulate shuttling by playing at different rates, based on the shuttle control position. Better results can be obtained by directly supporting shuttling with the *cmdShuttle* command.

cmdInsertEdit

No longer needed starting in CC, if the Edit to Tape panel is supported. Otherwise, this was sent if the device controller supports insert mode and wants to control the edit (set `fExportDialog` and `fCanInsertEdit` during *cmdGetFeatures* to do so).

When the user invokes Export To Tape, Premiere prepares to play the chosen clip and sets the following in the `DeviceHand`:

`command` = *cmdInsertEdit*
`mode` = `modeRecord`
`xTimecode` = duration of the movie

Premiere then enters a loop, calling the device controller with the above `DeviceHand`. When the device controller returns, Premiere sends the `PrintProc` specified in `DeviceHand.setupWaitProc`. Premiere will have already performed the preroll; everything is ready to play.

When the device controller returns, Premiere plays the clip, sending idle to `PrintProc` once per frame. Premiere again calls the plug-in's entry point with the `DeviceHand`, allowing the device controller to perform any cue operations. Premiere calls `PrintProc` with complete when finished. If *cmdInsertEdit* is proceeding correctly `PrintProc` should always return 0.

cmdGetDeviceDisplayName

Sent so the device controller can provide the device display name for display in the Capture Panel. The device controller fills in `DeviceRec.displayName`.

cmdSetDropness

Sent only if `DeviceRec.autoDetectDropness` is set to true. This selector tells the device controller whether the current timecode is drop-frame or non-drop-frame, as determined by the active recorder. The timecode information is passed in `videoStreamIsDrop` in `DeviceRec`. Sent when recorder determines drop-frame attribute and calls `FormatChangedFunc`.

cmdSetDeviceHandler

New in CC October 2013. Optional. Tells the plug-in which panel is using the device controller -- either the Capture panel, or Export to Tape panel. `DeviceRec.mode` will contain either `handlerCapture` or `handlerEditToTape`.

14 Control Surfaces

Starting in Premiere Pro CC 2014, a control surface plug-in can interface with a hardware control surface. This is the API that provides built-in support for EUCON and Mackie devices to control audio mixing and basic transport controls. The API supports two-way communication with Premiere Pro, so that hardware faders, VU meters, etc are in sync with the application.

Compile the sample plug-in into a subfolder of the main application folder: Plug-ins\ControlSurface\

You should see the plug-in in the PPro UI in Preferences > Control Surface, when you hit the Add button, as one of the options in the Device Class drop-down next to Mackie and EUCON (currently shows as "SDK Control Surface Sample").

You'll want to implement handlers for any relevant functions defined in the plugin suites here: adobesdk\controlsurface\plugin
And to do that, you can use any APIs to call into the host defined in the host suites here: adobesdk\controlsurface\host

Calling Sequence

When the application is launched, the control surface plug-ins are loaded, and the entry point is called. The host ID and API version is passed in, and the plug-in passes back ADOBESDK_ControlSurfacePluginFuncs, an array of function pointers.

Next, the Startup() function is called, where the plug-in registers a suite of functions as defined in ControlSurfacePluginSuite.h. For each base class it will inherit from (defined in adobesdk\controlsurface\plugin\wrapper), it calls RegisterSuite(). These suites are the way for the host application to call the control surface plug-in later on. There are separate base classes for the transport controls, audio mixer, Lumetri Color controls, and more.

Then, CreatePluginInstance() is called. When a project is opened, Connect() is called. Here the plug-in instantiates a ControlSurface object, which inherits from any of the previously mentioned base classes. It acquire any host suites it needs, and then it passes back a reference to the ControlSurface object.

Getting Started

Please write us if you would like further guidance.