Cool Edit Pro Multichannel Encoder Manual

Multichannel Encoder

The latest version of Cool Edit Pro includes the Multichannel Encoder. This is a self-contained dialog where you can access the tracks of any existing CEP 2 Multitrack session. In the Multichannel Encoder dialog, you can individually pan each track to your multichannel setup, preview the current mix and then Export the session as an encoded WMA Pro version 9 Multichannel file. It is also possible to export your session as 6 Mono Wave files or as one interleaved 6-channel Wav file for use with an external Multichannel Encoder such as a Dolby or DTS encoder.

CEP 2.1 Multichannel Encoder Requirements

To achieve proper "5.1 Surround" preview playback from the Multichannel Encoder, it is necessary to meet the following requirements:

1) A sound card installed and selected that offers at least 6-channel analog output, as well as a special interleaved device driver that is compatible with the Microsoft DirectSound multichannel format.

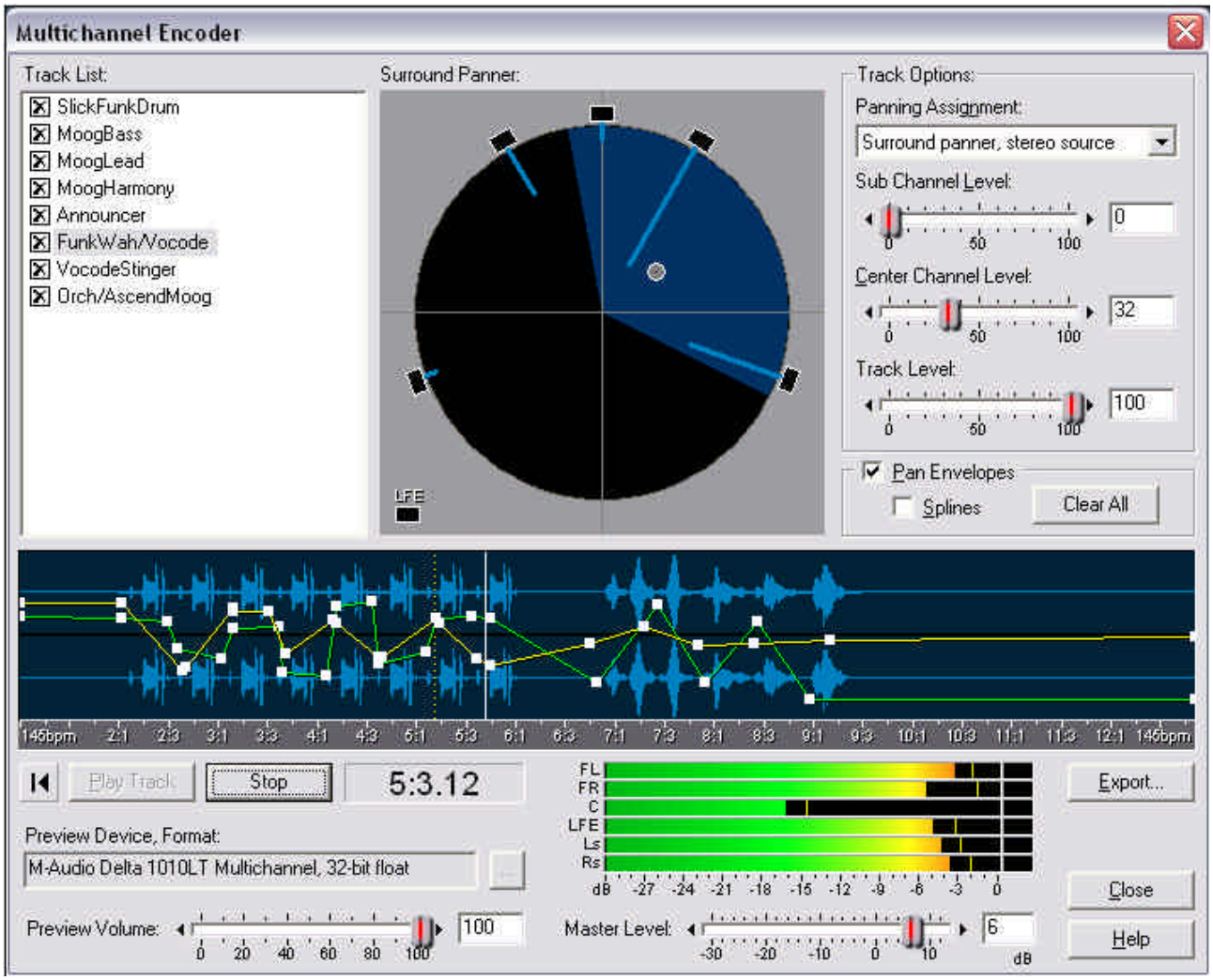
2) Microsoft Direct X 8.0 or later installed

If your PC does not meet these requirements then you may receive a warning dialog, and your Play Track and Play All buttons will not be accessible.

To be able to Export and Encode your project to a 6-channel Windows Media file, you must have the Windows Media 9 runtime installed. If you have an earlier Windows Media version on your PC, the Encode to WMA9 option will not be available.

The latest Direct X and Windows Media Updates are available on the Microsoft website.

To use the Multichannel Encoder, first open an existing Cool Edit session, or create a new session in the Multitrack window. Once all your tracks are added, you next want to achieve a basic stereo mix balance with your desired track volume, stereo pan and FX settings. Then launch the Multichannel Encoder from the View menu. Below is a description of the elements found in the Multichannel Encoder:

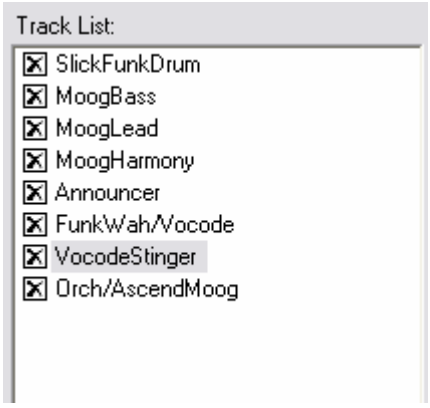


Track List
At the top left of the dialog is the track list. This list will show all the tracks and buses in use in the current CEP multitrack session. You select which tracks and/or bus outputs you want to be included in the multichannel mix by checking the box at the left of each track. Any track that is unchecked here will be removed from the multichannel preview and will not be included in the Export of the multichannel project.

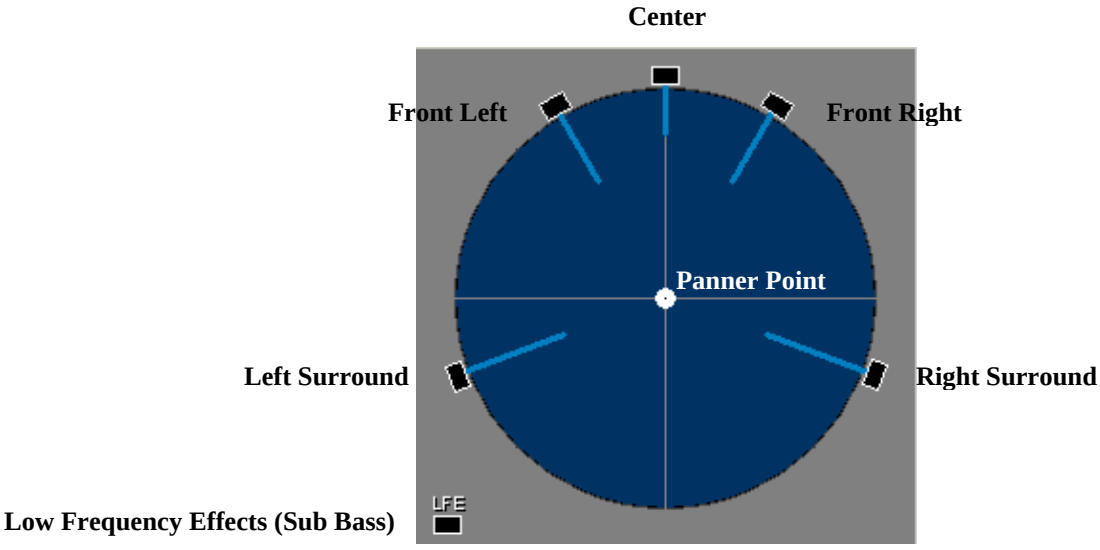
Panning Tracks and Buses separately - Note that if you have routed a track's output to a bus in the Multitrack that you will likely not see that track appear in this track list. Instead, the bus that the track was assigned to will appear in this track list, and the bus output (which consists of all track signals routed to that bus) can be selected and panned as one mono or stereo signal. Additionally, it is also possible to access the "dry" track signal and pan it separately as well. This is achieved by going into the CEP bus tab at the left of the track, or into the CEP multitrack Mixer Window, switching to the Bus Mixer tab and adjusting the balance of the wet and dry values. Once the dry value is set greater than 0, this creates a selectable track entity that will appear in the Mulitchannel Encoder Track List the next time you launch it.

For an example, consider that track 1 of a session consists of a vocal wav file. You might have several other vocal tracks in this session as well and therefore you might add one Reverb effect on Bus A and set each vocal track's output to Bus A to have all be effected by this Reverb. But for track 1 you might wish to achieve a different surround panning effect where a non-effected track signal is panned to the front channels, while the effected bus output signal is sent only to the rear surround channels. If you set the track 1 bus wet and dry values each to a value such as '50' then you will be able to pan these two signals separately. Once these settings are all made within the multitrack session, launch the Multichannel Encoder dialog and you will then see that both "Track 1" and "Bus A" are available as selectable entities that can be panned individually. This type of routing can be very useful for adding ambience and dimension to your multichannel mixes.

To perform panning adjustments on any track, select any one track in the list by clicking on the track name so that it becomes highlighted. For example, the VocodeStinger track is selected in the following example:



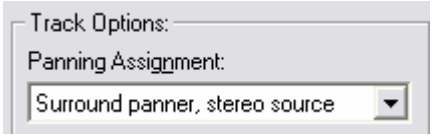
Surround Panner interface



The Surround Panner allows you to position the selected track anywhere in the main speaker sound field by left clicking and dragging the white “Panner Point”. Note that as you position the Panner Point within the circular sound field the light blue “Power Indicator” lines coming from the speakers will change in length. This indicates the power balance of your sound source coming from each of the five main channels. Additionally, a portion of the sphere will appear dark blue in color to indicate the image of the sound field. That is, when seated in the center of the speakers, the blue area indicates where the listener would perceive the sound coming from.

You can also drag the Panner Point outside the sound field directly on top of one of the five main speakers or on top of the LFE speaker. Once the Panner Point is in any one of these speaker locations, the audio from the currently selected track is summed to a mono signal and sent discretely to this one speaker channel. This is an easy way to send the complete track signal all to one channel.

Panning Assignment Selector



At the top right of the dialog is the Panning Assignment selector where you can choose to either use the Panning Interface to position your track sound source, or to make ‘fixed” panning assignments for your track. To follow is a description of each of the options in this list:

Surround panner, stereo source
This option allows you to use the Panning Interface to position your sound source by way of dragging the Panner Point to the desired position. It also keeps your stereo left and right signals from your track discrete when panning in the sound field. For example, if your track includes a stereo file, the left stereo signal will be sent to the Front Left and Left Surround channels, your track’s right signal will be sent to the Front Right and Right Surround channels. The Center channel always receives a summed to mono (L + R) signal. Therefore, as you pan in the five channel sound field, these stereo sources will retain their “stereo image” while being routed to the multiple channels.

Surround panner, summed to mono
This option allows you to use the Panning Interface to position your sound source. However, this option always sums the track’s signal to a mono signal. In this mode, panning the sound source to any location in the sound field will result in the summed mono signal being fed to all channels.

LFE only
Sends the entire track signal to the LFE channel. Your monitoring system will apply the proper crossover frequency cutoff for reproducing the audio sent to the LFE channel. Typically most LFE components in 5.1 surround playback systems are set to a cutoff of < 80 Hz or < 120 Hz. The CEP 2 Multichannel Encoder itself does not apply any filter to the LFE channel audio.

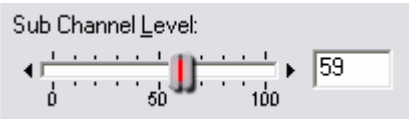
FL + FR, stereo
Sends the selected track's signal as a stereo source directly to only the Front Left and Front Right speakers in a 50/50 stereo balance.

Ls + Rs, stereo
Sends the selected track's signal as a stereo source directly to only the rear Left Surround and Right Surround speakers in a 50/50 stereo balance.

Center + LFE, stereo
Note that this option is most useful with a stereo source file – when this option is selected for a stereo track, it will route the track's left channel signal to the Center channel and the track's right channel signal to the LFE channel discretely. If this option is selected for a track containing Mono source file, then the same signal will be sent equally to both the Center and LFE channels.

Center only, FL only, FR only, Ls only, Rs only
These options each sum the selected track's audio to a mono signal and send it all to the selected channel. This is the same as dragging the Panner Point directly onto one of the five main speakers in the Surround Panner interface.

Sub Channel Level Slider

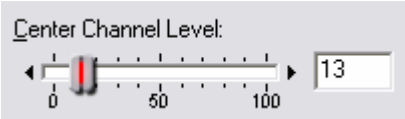


When in one of the Surround Panner modes, the Panner Point positions the sound source balance between the five main channels. However, you can also raise the amplitude of this slider to additionally send the track's signal to the LFE channel. With this slider set to zero, no track audio is sent to the LFE channel. * If the currently selected track is assigned to only the LFE channel, this slider will attenuate the amount of this track's output sent to the LFE channel.

It is also worth noting that CEP 2's Multichannel Encoder does NOT apply filtering to audio sent to the LFE channel, nor does it apply any filtering during preview, exporting or encoding. This allows you to apply your own specific filtering as needed for your projects. Therefore, any low-pass filtering needed for your final LFE channel content should be applied to your audio within the CEP 2 Multitrack, or on your Exported wav files.

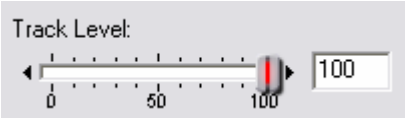
***** It is recommended that you utilize a Bass Management circuit in your monitoring setup to ensure that you hear the representative mix levels that might be reproduced in an end listener's playback system. Often home receivers and LFE equipped speaker systems will employ a bass management circuit on playback that will automatically route ALL sub-120 Hz or lower frequencies from all channels to the LFE speaker. Therefore, it is possible to overdrive the end listener's system by sending too much overall sub-120 Hz audio to the LFE channel. Further, some playback systems and even encoder systems will apply a + 10 dB boost to LFE content. The use of a bass management circuit in your monitoring system will therefore allow you to compensate for these playback scenarios and adjust your mix accordingly.

Center Channel Level Slider



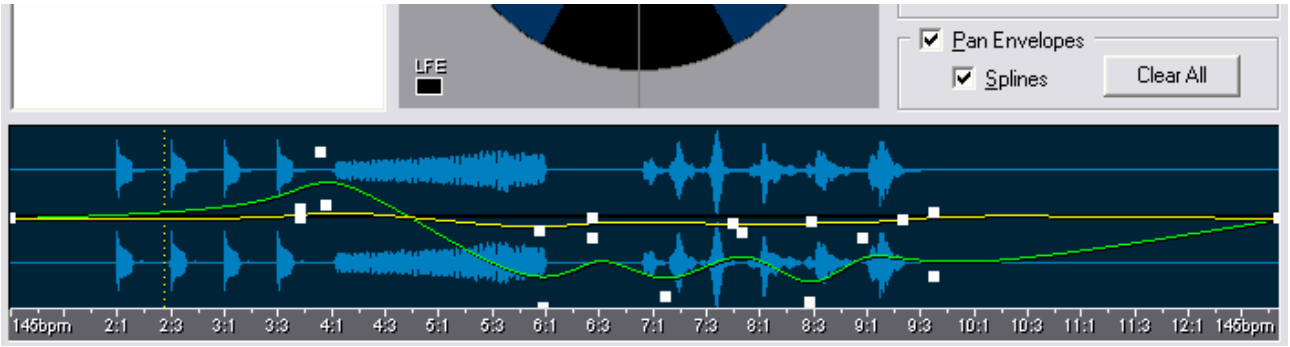
When in the Surround Panner modes, the Center slider determines the balance of the FL, Center and FR channels. With this slider at 0, no signal is sent to the Center channel. With this slider at 100, the Center channel receives an equal % of signal as the FL and FR. The position of the Panner Point then determines the positional panning according to this FL, Center, FR balance ratio.

Track Level Slider



In any selected pan mode, this level slider controls the amplitude level of the currently selected track within the Multichannel mix.

Pan Envelope Automation



When the Pan Envelopes checkbox is selected, two envelope lines are shown in the waveform display window. The yellow envelope line controls the Left/Right balance and the green envelope controls the Front/Surround balance. These envelopes are interactive with the positioning of the Panner Point in the Surround panner interface. It is possible to create dynamic panning over time by using these envelopes. To create a dynamic pan on a track, follow these steps:

- Select and check the box for one of your tracks in the Track List
- In the Panning Assignment menu, select either the “Surround Panner, stereo source” or Surround Panner, summed to mono” options
- At the top right of the Waveform display section, check the “Pan Envelopes” checkbox. You will see two envelope lines appear in the Waveform display. The yellow line starts on top of the green line, though, so you may only see the yellow line until you change the pan position.
- Left click in the waveform display at the desired time location where you would like to set a pan destination for the sound source. This moves the vertical cursor to this time location.
- Now move the Panner Point to the desired position in the five channel sound field. Note that as soon as you move the Panner Point that two “handle” points are created on the Envelope lines within the Waveform display. These handles now move with your positioning of the Panner Point.
-You can also left click directly on either of the envelope lines to create additional adjustable “handles” for shaping the envelope lines.
- These Envelope handles are now also able to be edited by left click dragging them to any position, and the Panner Point will move in tandem to show you the relative position in the sound field during playback. If you wish to delete any single handle, simply drag it up or down beyond the boundary of the waveform display area.
- To clear all envelope handle points and reset the track to flat envelopes, click on the “Clear All” button at the top right of the waveform display area.
- Select the “Splines” checkbox if you prefer the envelope to use rounded Spline curves for smoother transitions between points.
- Place the playback cursor back to the start of the track and select one of the Play buttons. Watch the Panner Point position and listen for the dynamic pan setting you just created.

If you prefer to keep your track panned to a fixed point throughout the duration session, then simply de-select the “Pan Envelopes” checkbox. This removes the Envelopes from the waveform display and allows you to set the Panner Point to any static position you like. You can toggle the Pan Envelopes setting on/off and any envelope points you have created for this track will be retained. Note that if the Pan Envelopes checkbox is not selected, you can drag the Panner Point during playback and hear your static pan positioning in real-time.

Zooming

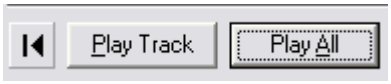
There are several options for zooming in and out within the Waveform Display. To access the four available Zoom commands, place the mouse cursor over the time ruler which runs across the bottom of the waveform display and right click to bring up the context menu. The four available options here are:

Zoom In
Zoom Out
Zoom Full
Zoom to Cursor

You can also zoom in to a specific time area by right click-dragging the desired area on the time ruler itself. To Zoom back out again, right click and choose Zoom Out or Zoom Full from the context menu described above.

Another handy Zoom method is to place the mouse pointer anywhere within the waveform display and turn the mouse wheel. This will zoom into the time area directly beneath the mouse pointer. Reversing the mouse wheel rotation will zoom back out incrementally.

Transport Controls

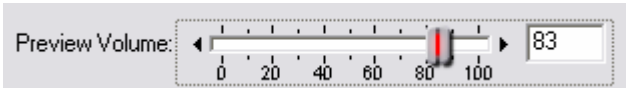


Rewind to Start - This left arrow button will place the cursor back at the start of the track.

Play Track – This starts preview playback from the cursor location and only plays the currently selected track. Playback will always play to the end of the track, regardless of the current zoom level.

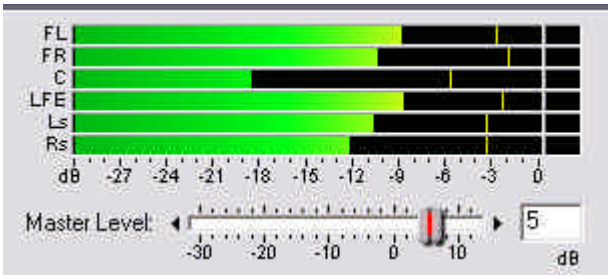
Play All – This starts preview playback from the cursor location and plays the multichannel mix with all tracks that are checked in the Track List. Playback will always play to the end of the session, regardless of the current Zoom level.

Preview Volume Slider



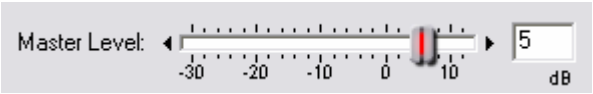
Controls the volume of the preview playback – note that this slider will not change the amplitude of the exported WAV or encoded WMA files that are created from the Multichannel Encoder, nor will it affect the levels measured by the 6-channel Output Meter. Use the Master Level slider for that use. This slider should be used to adjust your playback volume without affecting the amplitude of the exported files.

Output Meters



This set of six meters displays the output of each of the channels during Preview. During “Play Track”, the meters will display the output of only the selected track, and during “Play All” the meters will display the output of the complete 5.1 mix. These levels are what the actual levels will be for your exported wav or wma files from the session. The overall 6-channel level can be attenuated by the Master Level slider beneath the meters.

Master Level Slider

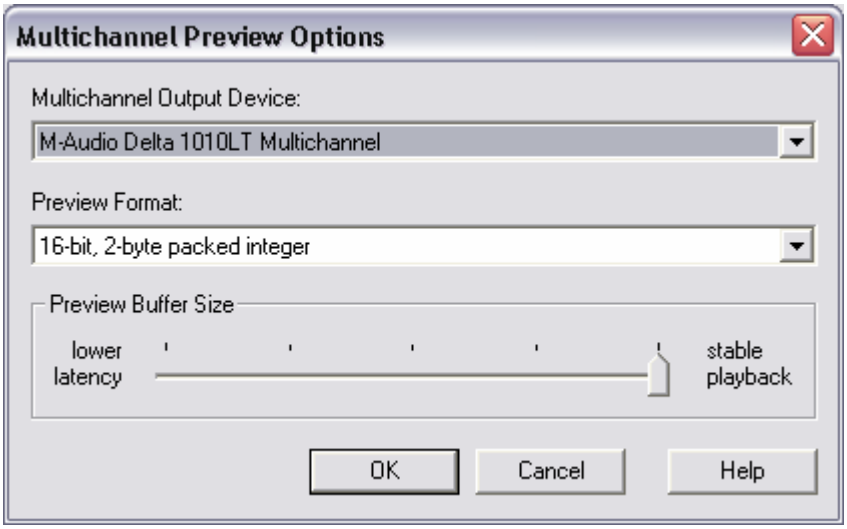


The Master Level slider will affect the audible level of your preview playback; however, this slider is primarily offered to adjust the amplitude of the exported or encoded files. Use this slider and reference the meters to optimize the overall peak amplitude of the 5.1 channel mix so that none of the channels are clipping.

Preview Device Selection

Please refer to the “Multichannel Encoder Requirements” on the first page of this document for Device requirements.

The Preview Device field displays the currently selected device that CEP 2 will route its 6-channel output to. This field will also show the currently selected bit rate for preview playback. To make changes to these device and bit selections, press the “Change” button to the right of this field. This will launch the Multichannel Preview Options dialog:



Some sound cards that offer “5.1 playback”, such as the Creative Labs Audigy, will display only one device driver listed, and this is the device that should be selected since the sound card’s driver will route the 6 channels of audio to the correct speakers.

Some professional sound cards such as the M-Audio Delta 1010/1010LT or 410, Echo Layla24, Frontier Design Dakota and EgoSys WaMi units offer a single “Multichannel Device” driver, in addition to several individual stereo drivers. For these cards that offer this special “interleaved” multichannel driver, you should select this from the list. For example, for the M-Audio Delta 1010LT sound card that offers this type of driver, it shows up as:

“M-Audio 1010LT Multichannel, 16 bit”

These driver types will accept the 6-audio input from CEP and automatically route it to the standard Microsoft 5.1 channel configuration listed below.

Channel Order
When connecting your speakers to the analog outputs of a Multichannel sound card that offers the required interleaved multichannel driver, you should ensure that your speakers are connected in this order to correctly reproduce the 5.1 surround preview:

Out 1 – Front Left speaker (FL)
Out 2 – Front Right speaker (FR)
Out 3 – Center speaker (C)
Out 4 – LFE - Sub Woofer speaker (LFE)
Out 5 – Left Surround (rear) speaker (Ls)
Out 6 – Right Surround (rear) speaker (Rs)

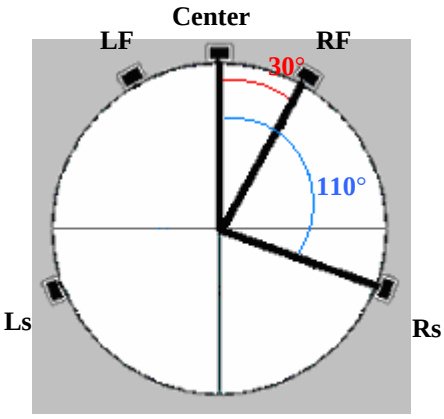
Note that the above channel order is also the order in which your Exported 6-channel .wav and 6-channel .wma files will be created. If your project requirements include a different

channel order (such as if you are submitting a master for use in a DTS encoded project or other surround format), then you should choose the Export to 6 mono wav files option.

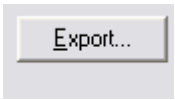
Preview Format Selector
Use this drop down menu to select the bit rate of the preview playback material that is sent to your sound card. This can be kept at 16 bit, but if your session includes higher bit rate files, and if your sound card supports higher bit rate playback, you can select one of the 24 or 32 bit rates here to allow the preview to more accurately play back the higher bit rate content of your session.

Preview Buffer Size Slider
This slider is offered to allow adjustment of the size of the buffers used for both the Play Track and Play All functions. The slider can be adjusted to the right to create larger buffer sizes, which can allow for a more stable preview playback at the cost of raising the latency. A higher latency means that it will take longer for you to hear the result of changes made to any sliders or panning adjustments made while previewing. Adjusting this slider farther left will reduce the buffer size that can result in lower latency, but at the cost of less preview stability. If dropouts occur during preview playback, then the best action is to try moving this slider to the right. If you have a fast PC and/or if the session you are working on is a small one with few effects and panning envelopes, it may be possible to reduce the buffer size and take advantage of lower latency.

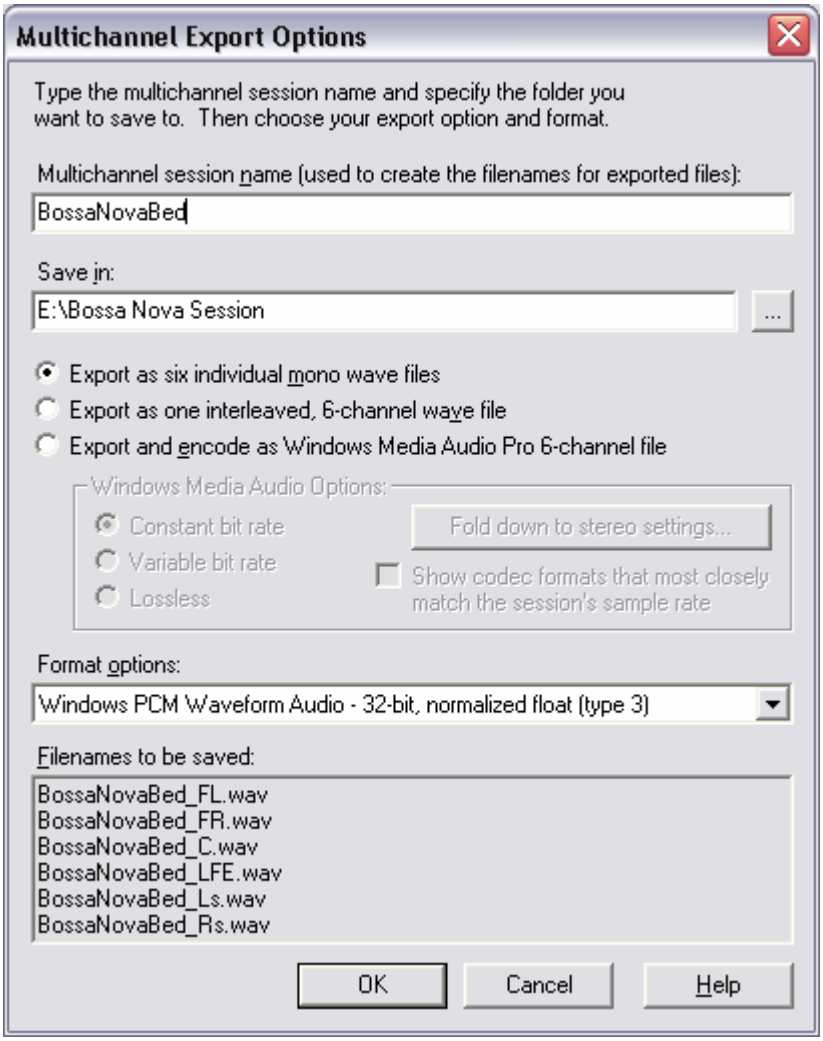
Speaker Placement
The recommended physical speaker placement is also important for accurate monitoring. Ideally, the five main speakers should be placed at ear level and each at an equal distance from your listening position. The LFE/Sub Woofer is a non-directional speaker, therefore, it can be placed anywhere in the room on the floor, but it would be practical to try moving it to slightly different floor positions to find the most accurate response within your environment. The following is the typical recommended setup for 5.1 speaker placement:



Export options



Once you have completed mixing your multichannel project you will then want to export it to your desired file format. CEP includes the ability to encode directly to an interleaved 6-channel Windows Media 9 Pro (WMA) file or to export into two WAV formats. The field in the main dialog indicates the currently selected format, and this format is retained from your last used export option. To select your export/encode options, select the “Export” button at the bottom right of the window. This launches the export dialog:



Multichannel Session Name field

The Multichannel Session Name field will automatically be completed with the name of your CEP 2 Multitrack session if you had already saved the session and named it. You can type a new name in this field if you like. Since it is possible to Export to one of three different options (6-Mono Wav files, one interleaved 6-channel Wav file or encoded as one interleaved WMA 6 channel file), there are also different naming conventions for each. The following section explains the file naming conventions used for each scenario.

The text entered in the name field will be used as a common prefix for saving each exported file or files. Once the name text is entered into the name filed, you can then select the desired Export format, and in the lower “Filenames to be saved” the full filename(s) will be listed to show you how the Exported file(s) will actually be saved. For example, if the text “BossaNovaBed” were entered in the name field, the following would be how the files would actually then be named for each Export format:

For the 6-Mono Wav Export option, six files will automatically be rendered and saved with these names:

1 – “BossaNovaBed _FL.wav” (Front Left channel file)
2 – “BossaNovaBed _FR.wav” (Front Right channel file)
3 – “BossaNovaBed _C.wav” (Center channel file)
4 – “BossaNovaBed _LFE” (LFE channel file)
5 – “BossaNovaBed _Ls.wav” (Left surround channel file)
6 – “BossaNovaBed _Rs.wav” (Right surround channel file)

For the Interleaved 6-Cchannel Wave Export format, one file will be rendered and saved as “BossaNovaBed.wav”.

For the WMA 6-channel Export format, the file will be encoded in the WMA format and saved as “BossaNovaBed.wma”.

Save In
This field lists the currently designated directory where the Export files are to be saved. To select a different directory, you can either type in an existing directory path, or click on the button to the right of this field and browse to the destination of your choice.

Export Formats
Here you select the desired Export format. Below is a detailed description of each:

Export as six mono wav files
If you want to export to a format that can then be utilized by another audio software, or by a software or hardware surround encoder, such as to encode your project as Dolby Digital or DTS, then the best option is to Export the project as either as one interleaved 6-channel WAV file, or as 6-mono WAV files. The six mono wav files option will create standard Windows PCM .wav mono files that typically can be used by any Windows audio application.

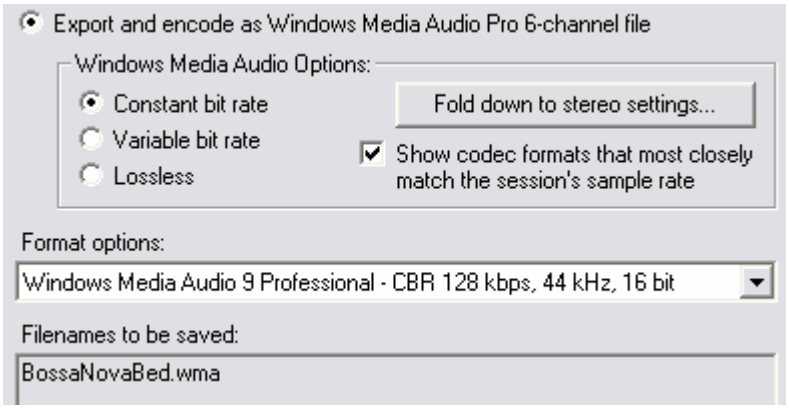
Export as one interleaved 6-channel wav file
The Windows PCM .wav format spec also allows for a single file to contain multiple channels of audio, however, not all Windows audio applications are capable opening or playing back wav files that are not mono or stereo. This interleaved 6-channel wav file

type is commonly used by many hardware and software encoding systems. Choosing this option will save the multichannel session as one 6-channel file following the Microsoft "Wave Format Extensible" (which is also the SMPTE & ITU specification) channel order, which is defined as:

1 - Front Left
2 - Front Right
3 - Center
4 - LFE
5 - Left surround (Rear Left)
6 - Right surround (Rear Right)

The above channel order is also the typical one utilized as the desired input for Dolby Digital encoders. However, if you are planning on preparing your project for a third party or specific encoding process, *it is recommended that you ask the recipient exactly which format they require since channel order requirements can differ for different encoding systems.* If a different channel order is required, then use the Export to 6 Mono WAV files when you export.

Encode as WMA 6-Channel



Multichannel WMA files are capable of being played back by anyone that has installed the Windows Media Player version 9 or later, assuming of course they also have a multichannel output sound card and 5.1 speaker setup. Media Player 9 also requires that the user is running Windows XP as their operating system. If the end user has the Windows Media 9 player on any other Windows version, then the multichannel file will automatically be "folded-down" to play as a stereo file. For more information on the Windows Media 9 technologies, please visit the Microsoft Windows Media website at:

http://www.windowsmedia.com

The WMA format utilizes a perceptual compression scheme and allows you to select from several different quality settings, including Constant Bit Rate (CBR), Variable Bit Rate (VBR) and Lossless. Just as with stereo WMA files, the higher quality setting you select, the larger the file size, and vice-versa. The Lossless option will compress to a smaller file size than wav, but will result in no fidelity loss whatsoever. To encode your project as

WMA, select the WMA option and then the desired quality setting in the Format Options drop-down menu.

The checkbox option “Show codec formats that most closely match the session’s sample rate” will limit the list of selectable WMA kbps option to those that are only the same sample and bit rate as the multitrack session’s files. If you uncheck this box, the complete list of WMA options will be presented.

A note regarding exporting for specific projects…
As mentioned above, if your project is to be sent out to a mastering, duplication or other outside service with the intention of being encoded into other specific surround or media formats, you should inquire with the recipient as to the format specifics. Channel ordering differs between surround formats. Also, the crossover frequency points vary among different formats as well. For example, DTS typically employs a crossover of 80 Hz, meaning that all frequency content of your channels lower than 80 Hz can be routed to a sub woofer, and all frequency content greater than 80 sent to mains. This differs from the Dolby Digital system that utilizes a crossover point of 120 Hz. Some systems also employ a boost of 10 dB for the LFE channel, automatically assuming your LFE content will be approximately this much lower in power than the main channels. Therefore, these components should be accounted for in your mix before you deliver your master files to the recipient. It is best to inquire with the recipient about all such requirements to ensure that the audience will hear your project the same as you are hearing it on your monitoring system!

Fold-Down to Stereo options
If the 6-channel WMA file is played back on a non-Windows XP system, or on a system that does not have a 5.1 playback setup, Windows Media Player 9 will automatically perform a “fold down” or “down-mix” of the 6-channel playback to a stereo playback. The Windows Media Player 9 does this by accessing channel attenuation instructions that CEP’s WMA encoder writes into the file. These attenuation parameters allow you to control how the levels of the Center, Surround and LFE channels get mixed down with the front stereo channels and played back on a stereo output system.

To access the above Fold down to stereo dialog, click on the **Fold down to stereo settings** button within the Multichannel Export Options dialog. The three numerical fields will default to –3, -3 and –12 dB as shown above. The defaults are usually good settings

for most files, but you can enter any value in any of these 3 fields between 0 and –144 dB as desired.

Opening Encoded and Exported files back in CEP

Once you have performed your Export from the Multichannel Encoder dialog and created the new WMA or WAV file(s), you may wish to open the files back into CEP. CEP 2.1 or later is capable of opening 6-channel WMA or WAV files. To open a multichannel file in CEP's Edit View, simply go to File-Open as usual and this will open the multichannel file as six mono files.

> Note: 6-channel WMA files will only open as 6 mono files in CEP 2.1 or later if you are running on Windows XP. If you are using Windows 98/Me/2000, the 6-channel wma files will be automatically 'folded down' to a stereo file utilizing the 'Fold-down to stereo' parameters mentioned in the previous section. This is a restriction of the Windows Media file format imposed by Microsoft on these operating systems. This restriction is not imposed on 6-channel WAV files.

Once these 6 mono files are created within CEP, they can then be edited and saved back as just as any mono file within any audio application that supports wav files. If you wish to use CEP to save the files back as one single, interleaved multichannel WMA or WAV, you can open the exported 6-channel file in CEP. This will automatically split the file into six mono files you can then insert them into six tracks of a CEP multitrack session. To "save" these files back as one interleaved multichannel file, it is necessary to launch the Multichannel Encoder dialog and assign each file back to its own individual channel and perform an export again as WMA Pro or 6-channel WAV as desired. You should of course be sure to set the pan assignment to the correct channel order if you wish to keep the same channel order as the opened 6-channel file.