



Installation and User Manual

DTS Pro Series

surround encoder

A Full-Featured Suite for Today's Digital Audio Workstation

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1. Installation

1.1 PC Standalone Installation

System requirements

- PC computer, Pentium 4, 1GHz or higher (recommended)
- 256 MB RAM
- 1 hard drive, 7200 RPM minimum, 200 MB free disk space
- Greater than 20 GB disk space for audio files
- USB port for the license adapter key (dongle)
- Windows XP Home edition or XP Professional (SP1)

Surround Encoder installation procedure

The installation of the Surround Encoder software onto a PC computer is a simple process.

Three software components will be installed

- An update to Java virtual machine (if needed)
- Runtime for the adapter key dongle (WIBU, a third party)
- DTS Pro Series Surround Encoder software, which includes the Pro Packer, Pro Encoder, and Pro Encrypter utility and libraries

- Important:** Proper privileges are required to install and uninstall Surround Encoder software, including the WIBU driver for the auto-detected adapter key (dongle).

Instructions

- ⚠ Caution:** Do not install the adapter key (dongle) before the software has been installed. Install the adapter key into a USB port on your system **after** the software has completed installation.

1. Insert the CD-ROM (DTS #9311E90801) into the CD-ROM drive. The Installation process should start automatically. If it does not automatically start, then from the Start menu, select Run and Browse to the proper setup.exe on the CD-ROM.
2. Proceed through the series of prompts. Accept **all** default settings. Restart your computer when prompted to do so.
When installation is complete, a set of three icons will appear on your PC desktop.



3. Install the adapter key (dongle) (DTS #E907-02) into a USB port on your PC **after** the software has completed installation.

- ☑ **Note:** It is the responsibility of the owner of the DTS Pro Series Surround Encoder to keep the adapter key (dongle) in a safe and secure location. If the adapter is lost, DTS has no obligation to replace it.

If the adapter is damaged or malfunctioning, DTS will replace the adapter at no charge during the warranty period. If the adapter is damaged after the warranty period, a service charge will apply.

1.2. Mac Standalone Installation

System requirements

- Apple computer, Power PC G4 or higher (Dual Processor G5 recommended)
- 256 MB RAM
- 1 hard drive, 7200 RPM minimum
- 100 MB free disk space
- Greater than 20 GB recommended for audio files
- USB port for the license adapter (dongle)

Surround Encoder requirements

- Mac OS X version 10.3.5 or higher
- Java Runtime 1.4.1 or higher
There are patches available at:
<http://www.apple.com/downloads/macosx/apple/>
to install these two (above) to OS X version 10.2.
- Runtime for the adapter key dongle (WIBU, a third party)

Surround Encoder installation procedure

Preparation

The Surround Encoder is an application for OS X versions 10.2.8 onwards, with Java 1.4.1 already installed. OS X versions 10.3 and higher already have Java 1.4.1 installed.

If your version of OS X is before 10.2.0, you will need to purchase an upgrade to version 10.2 or higher.

If your version is higher than 10.2 but lower than 10.2.8, upgrade to the latest version with the **Software Update** utility or an update patch.

Once the operating system is at version 10.2.8 or higher, you will be able to upgrade to Java 1.4.1. This can be done with the **Software Update** utility or an update patch.

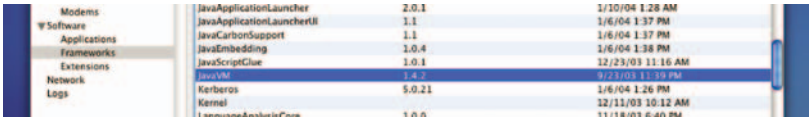
- ✓ **Important:** Proper privileges are required to install and uninstall Surround Encoder software, including the WIBU driver for the auto-detected adapter key.

Displaying System information

Click the Apple icon at the top left of the screen and select **About this Mac**. The operating system name will display in a pop-up box, along with the version number.

Click the **More Info...** button to inspect other settings.

To see which version of Java is installed, from the **View** menu, select **Extended Report**. Then select Frameworks in the left-hand contents listing. Scroll down to the **JavaVM** entry. The version number is shown in the **Version** column.



Modems	JavaApplicationLauncher	2.0.1	1/10/04 1:28 AM
Software	JavaApplicationLauncherII	1.1	1/6/04 1:37 PM
Applications	JavaCarbonSupport	1.1	1/6/04 1:37 PM
Frameworks	JavaEmbedding	3.0.4	1/6/04 1:38 PM
Extensions	JavaScriptClue	3.0.1	12/23/03 11:16 AM
Network	JavaVM	1.6.7	1/21/05 1:35 PM
Logs	Kerberos	5.0.21	1/6/04 1:26 PM
	Kernel		12/11/03 10:12 AM
	LanguageResources	1.0.0	11/14/04 6:40 PM

Figure 1. JavaVM entry in the Frameworks listing

Updating software

- ✓ **Note:** This procedure requires active Internet access.

Open **System Utilities** from the taskbar and double-click the **Software Update** icon. A list of updates will be displayed. Check and download those that you require.

Installing DTS Surround Encoder

- ⚠ **Caution:** Do not insert the adapter key (dongle) before the software has been installed. Insert the adapter key into a USB port on your system **after** the software has completed installation.

The WIBU key runtime environment must be installed in order to run the DTS Surround Encoder applications. The installer/uninstaller program is provided on the disc.

1. Make sure the adapter key is not inserted.
2. Insert the CD-ROM (DTS #9311E90801) into the CD-ROM drive.
3. Double-click on the DTSProSeriesEncoder.dmg file. (This is the compressed disc image.) It will open automatically.
4. Double-click on the WIBU installer WkRtMacX.hqx icon to decompress the WIBU adapter key runtime application. A dialog box will prompt you to identify a location to place the WIBU application. Save the installer/uninstaller to your desktop.

5. Double-click the blue WIBU Vise icon to launch the installer. Choose Easy Install . The wizard will take you through the rest of the procedure.
6. Install the DTS Encoder. Double-click on the icon DTSProSeriesEncoder.pkg to start the installer. The wizard will take you through the rest of the procedure.
- Important:** The package must be installed onto the root volume of the operating system. Applications are installed in the folder /Applications/dts/.
7. Eject the disc image.
8. At this point you may erase the WIBU installer/uninstaller, if you wish.
9. Install the adapter key (dongle) (DTS #E907-02) into a USB port on your Mac after the software has completed installation.
10. Once the installation is complete, the applications can be opened by browsing to /Applications/dts/ and double-clicking the appropriate file.

Filename	Description
DTSPacker.jar	Pro Packer Utility – this is the first application to open, if you need to pack and encode files. The packer prepares the audio for the encoder. The Packer also informs the encoder about the channel configuration, sample rate, time code information, and frame rate information.
DTSEncoder.jar	Surround Encoder application. The Encoder will not accept files that are not packed. Open the DTS Encoder first, only if there are files that have already been packed.
DTSEncrypter.jar	Encryption Utility

It may be useful to create aliases for the files so that the applications can be launched from the desktop. This can be done by dragging the application icon to the dock.

- Note:** It is the responsibility of the owner of the DTS Pro Series Surround Encoder to keep the adapter key (dongle) in a safe and secure location. If the adapter is lost, DTS has no obligation to replace it.

If the adapter is damaged or malfunctioning, DTS will replace the adapter at no charge during the warranty period. If the adapter is damaged after the warranty period, a service charge will apply.

2. Overview

There are three components to the Pro Series Surround Encoder system, Pro Packer, Pro Encoder, and Pro Encrypter utility.



- ☑ **Important:** All audio files to be encoded must first be processed using the Pro Packer.

Start with the Pro Packer

The purpose of the Pro Packer is to bring all the source audio files together into a single file. The Pro Packer checks the length of the files and the sample rate, to ensure that you are supplying the encoder with compatible source files. **See Using the Pro Packer, section 3.**

- ☑ **Important:** Open the DTS Encoder first, **only** if there are files that have already been packed.

If you choose Pack and Encode, the Pro Packer will automatically open the Pro Encoder to encode the packed file. See **Encoding Immediately after Packing** on page 12. Otherwise, you can pack the files and encode them at another time or location. See **Using the Encoder in Standalone Mode** on page 14.

Finally, if needed, use the Pro Encrypter utility to encrypt files for secure electronic transmittal from place to place. See **Encrypting a File** on page 18.

3. Using the Pro Packer

Start the DTS Multi-channel Pro Packer (activate the Pro Packer icon). The Pro Packer screen will display.

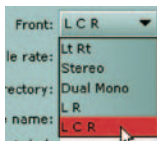


Figure 2. Pro Packer — Initial screen

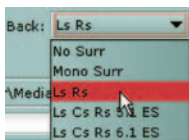
Our example

In this example, 48 kHz files are being packed and then encoded to produce a DTS 5.1 DVD.

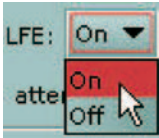
1. Select channel mapping L C R for the **front** channels. See Table 1, page 11.



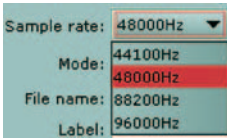
2. Select Ls Rs channel mapping for the surround channels. See Table 1, page 11.



- LFE is set to ON. See Table 1, page 11.

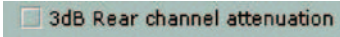


- Sample rate is set to 48 kHz. The Sample rate here must match the sample rate of the source files. See **note 1**, after step 12, page 10.

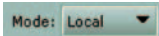


- 3 dB Rear channel attenuation is left OFF.

3 dB rear channel attenuation is used in cases where you have a theatrical master that has not been remixed or repurposed for DVD, and the rear surrounds (right and left) are typically 3 dB higher than they should be for home theater.

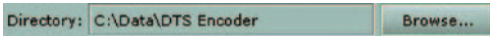


- Mode: the only option is Local, meaning the output file will be placed on your local computer.



Next, determine the location for the output packed file. The Browse button will open a Select Output Directory window that you can use to navigate to the correct directory.

- Identify the directory where the output files will be located. Click Browse and navigate to the **parent**¹ of the desired directory. Click the target directory name to select it, then click **Select**.



- Type a name for the packed file that you will make.

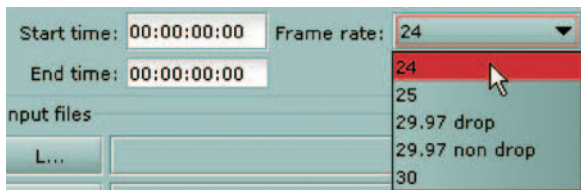


- (Optional) Add your company name, project name, or other details here.



¹Parent = the next higher directory

- 10. Frame rate:** If the audio track is intended to sync with video, be sure to match its frame rate. If the video reference is drop frame, you **MUST** select drop frame here.



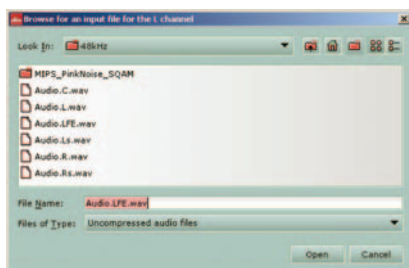
If it is important to match the start of the audio track to some specific point in the video, enter the **Start time** here, in hours:minutes:seconds:frames (hh:mm:ss:ff) format. The End time will be calculated automatically, based on the length of the Input Files and the selected frame rate.

- 11.** The **Input Files** section of the screen is where you select the individual source file to be assigned to each encoded channel. (See the Special Case following step 12.)



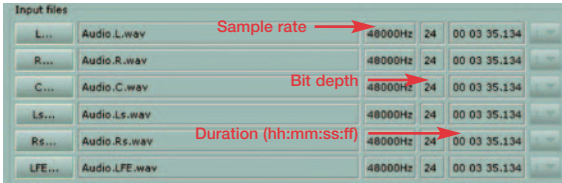
Click the cursor on the left-hand column (the L in this example) to open a file selection window (shown below).

Browse for an input file for the L channel, then select it.



To select, double-click on the file in the list. Or highlight the file and click **Open**.

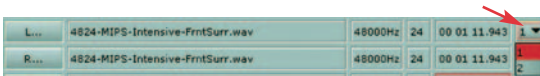
12. Repeat step 11 for the other channels.



Input files have been selected for all channels. For each input file, the sample rate, bit depth, and duration is identified. See note 1, below.

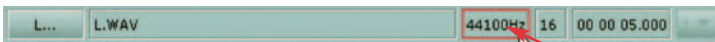
Use the duration information to check that the input files are identical in length. See note 2, below.

Special Case: This packer will accept a stereo source file to assign to a single channel.



The pulldown on the right is to select channel 1 or channel 2 from a stereo source file.

- Note 1:** If the sample rate of the input file does NOT match the sample rate you have chosen for the output file, a red outline will appear around the input file's sample rate, as shown in this example.



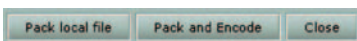
Input file sample rate does not match the selected output sample rate. In this case, you must change the output sample rate to match (step 4) or provide inputs of the proper sample rate.

- Note 2:** If the duration (length) of an input file does NOT match the duration of another input file, a red outline will appear around the input file's duration, as shown in this example.

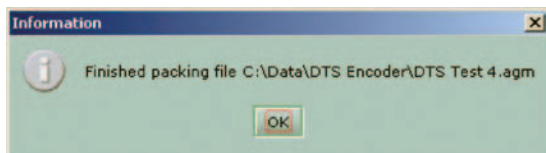


The duration of all input audio files must be the same.

13. Next, there are three choices. Choose **Pack and Encode** (to **both** pack and encode at this time) or choose **Pack local file** (if you are going to pack the file **now** but it will be encoded **later** — see page 12). Choose **Close**, if you do not want to continue. (Your selections so far will be discarded.)



Click **“Pack and Encode”** to generate the packed file and launch the encoder. (If the output file already exists, the Packer will prompt you to overwrite it.)



The above prompt will display when the packing is finished. Then the Surround Encoder program will be automatically activated (next step).

At this point, the packed file(.agm extension) will be found in the output directory. All packed files have the .agm extension.

Table 1

Channel Configuration Combinations				
Front Channels	Back Channels	LFE On/Off	Input fields in pull-down selection (steps 1, 2, 3 pg 4)	Brief description of format
Lt/Rt	Grayed out	Grayed out	Lt, Rt	L/R matrix
Stereo	Grayed out	Grayed out	L, R	Stereo
Dual Mono	Grayed out	Grayed out	Ch 1, Ch 2	2-ch. mono
L R	Mono Surr	On, Off	L, R Surr Ls Rs	Stereo front with either mono or stereo surround
L C R	No Surr Mono Surr Ls Rs Ls Cs Rs 5.1 ES Ls Cs Rs 6.1 ES	On, Off Cs	L, C, R Surr Ls, Rs stereo surround, or DTS 5.1	L, C, R with no surround, mono surround, DTS 5.1ES, DTS 6.1ES

4. Encoding Immediately after Packing

Since we chose “**Pack and Encode**” in our example, the Pro Surround Encoder program starts automatically when the Packer is finished (Figure 3) and runs in a separate window on the desktop.



Figure 3. DTS Pro Series Surround Encoder Screen

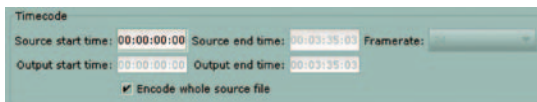
1. Almost all the settings on this page are carried over from the Packer program.



By default, **Use source file directory** and **Use source file name** are checked (as in this example), so the Encoder will use the same filename and directory of the packed (.agm) file.

Otherwise, uncheck these options, type a filename, and navigate to a directory for the encoded file.

2. If **Encode whole source file** is checked, the **time** fields are read-only. If unchecked, both the **Output start time** and **Output end time** are editable. Use output start and end times if you want to encode a portion (not all) of the source file. For example, this is where you would trim the pre-roll and post-roll of the project.



The Frame rate cannot be edited (it is read-only).

3. These fields are automatically filled with information carried in the packed file.

Reset — click this button to reload the values from the packed file, if necessary.

4. Bit Rate and Output type

For 44.1 kHz and 88.2 kHz source files, only one bit rate (1234800) and output type (.wav) are possible.

With 48 kHz source files for DVD encoding, **Bit rate** is selectable: 1509750 bits (1.5 Mbps) or 754500 (754 kbps).

With 48 kHz source files, **Output Type** is also selectable:

- DTS wave format .wav (Intel byte order, wav header)
- DTS padded format .dts (raw file, no wave header, Motorola format, and zero padding to fill frames)
- DTS compacted format .cpt (Motorola byte order, zero padding is removed, timecode is removed but a start time is present). This is the output type needed for the Apple DVD Studio Pro V3.0.

Wav format is used for music where there is no picture to lock to. Wav is typically for 5.1 or 6.1 music surround discs. Cpt and DTS formats are used in DVD authoring. Please refer to **DVD Authoring for DTS** on page 20, to determine the correct bitstream to use. Typically, a .cpt file is used, because the DTS format is a padded file that is used in older DVD authoring systems.

Dialog Normalization, click the arrows to change the setting, if necessary. For more information, see **Dialog Normalization**, page 21.

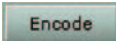
3dB rear channel attenuation is display-only here. This parameter is set in the Packer. (See step 5 on page 8 for explanation.)

Matrix ES into standard surround channels - (read-only flag) specifies mixing of Center Surround into Left and Right Surround.

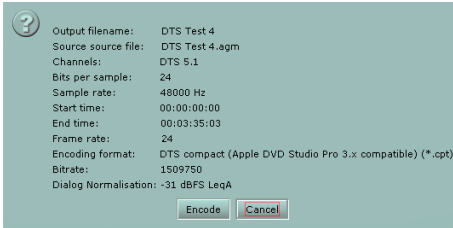
Phase shift ES channels — Works only with ES source files, where it allows for phase shifting of Left and Right Surround by $-45j$ prior to addition of Center Surround channel.

- ☑ **Note:** DTS strongly recommends Phase shift be set ON during 6.1 ES encoding for film. For music, you may wish to experiment with both settings. For more information, see the topic **DVD Authoring for DTS** on page 20.

- Click the **Encode** button.



A window will prompt you to review the encoder settings and confirm.

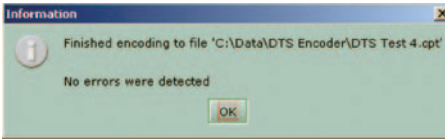


Click **Encode**.

A progress bar will display.



- When encoding is finished, a **confirmation** prompt will appear. It indicates the output file name and location.



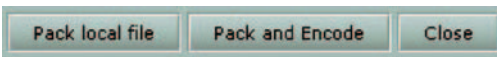
Click **OK**.

In the Output directory, you will see two additional files, the .log (encoding report) and the .cpt (encoded) file.

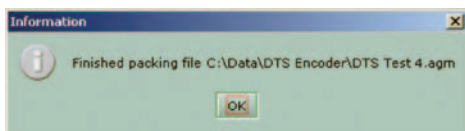
5. Using the Encoder in Standalone Mode

The DTS-Surround Encoder may be used separately from the Packer. The input file to the encoder must already have been packed (.agm format).

- In the Packer, you may choose **Pack local file** when you do not wish to encode the file immediately.



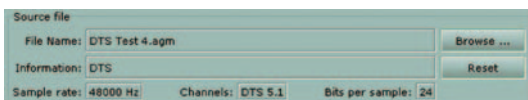
Click **“Pack local file”** to generate the output file. (If the output file already exists, the Packer will prompt you to overwrite it.)



This prompt will display when the packing is finished.

In the selected output directory, you will see an additional file — the .agm packed file.

2. In the Source file section, use the Browse function to select the packed.agm file that you want to encode.



In this example, DTS Test 4.agm has been selected as the source file. The other fields in this section are automatically filled in from information included in the packed file.

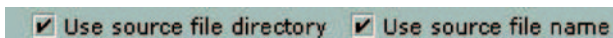
3. Type a name for the encoded file.



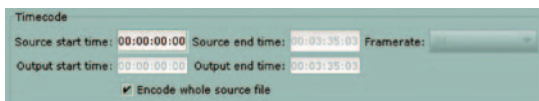
4. Use the Browse function to identify the output directory for the encoded file.



or: You can choose to use the same directory and filename as the packed file, by activating one or both checkboxes.



5. If **Encode whole source file** is checked, the **time** fields are read-only.



If unchecked, the **Output start** and **end times** are editable. Use output start and end times if you want to encode a portion (not all) of the source file..

The Frame rate cannot be edited (it is read-only).

6. In the DTS Settings section, choose the **Bit Rate**, **Output type**, and **Dialog Normalization** factor. (See step 4 on page 13 for explanation.)

3dB rear channel attenuation is display-only here. This parameter is set in the Packer. (See step 5 on page 8 for explanation.)



Bit Rate and **Output type** fields are automatically determined by the sample rate of the source material.

For 44.1 kHz and 88.2 kHz source files, only one bit rate (1234800) and output type (.wav) are possible.

With 48 kHz source files for DVD encoding, **Bit rate** is selectable: 1509750 bits (1.5 Mbps) or 754500 (754 kbps).

With 48 kHz source files, **Output Type** is also selectable:

- DTS wave format .wav (Intel byte order, wav header)
- DTS padded format .dts (raw file, no wave header, Motorola format, and zero padding to fill frames)
- DTS compacted format .cpt (Motorola byte order, zero padding is removed, timecode is removed but a start time is present)

Dialog Normalization: see definition on page 13 under step 4.

3 dB rear channel attenuation is display-only here. This parameter is set in the Packer. (See step 5 on page 8 for explanation.)

Matrix ES channels and **Phase Shift** for ES encoding, see step 4, page 13.

For more information, see the topic **DVD Authoring for DTS** on page 20.

- Click the **Encode** button.



A confirmation prompt will appear.

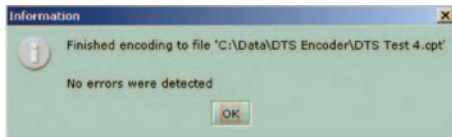


Review the settings and, if they are OK, click **Encode**.

- A status bar at the bottom of the screen will indicate the progress of the encode task.



Next, a prompt will inform you that the encoding task is finished.



Click **OK**.

In the output directory, the output file (.cpt in this example) and the encoding report (.log) will be listed.

6. Encrypting a File

Use the Pro Encrypter program to encrypt an .agm packed file for sending over an unsecure network to another location.

The DTS Pro Encrypter screen will display.

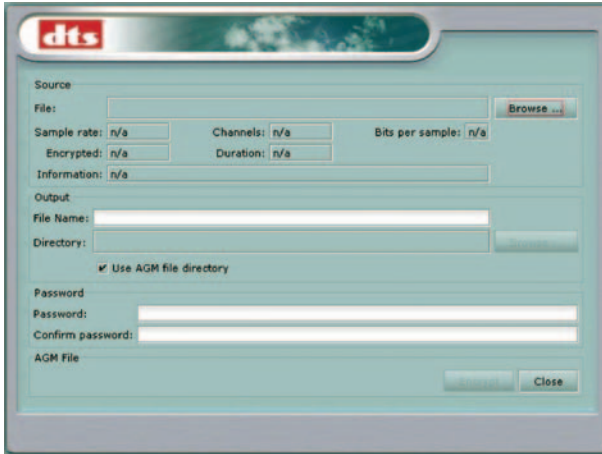
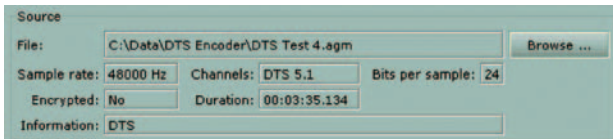


Figure 4: Encryption Utility screen

1. In the Source section, use the Browse function to select the source .agm file to be encrypted.



The information about the source file will be imported automatically. In this example, the DTS Test 4.agm has a sample rate of 48 kHz.

2. In the Output section, enter a File Name for the output encrypted file.

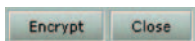


Use the Browse function to designate a directory for the output file,

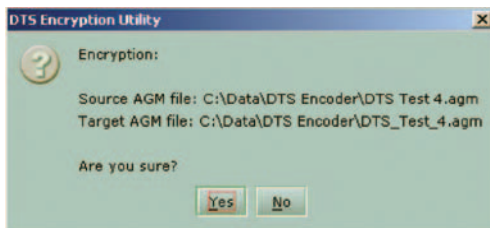
or: Activate the Use AGM file directory checkbox to use the same directory as the source file.

3. Enter a password (at least 8 characters long), and type the password again to confirm.

4. Click the Encrypt button to begin the process.

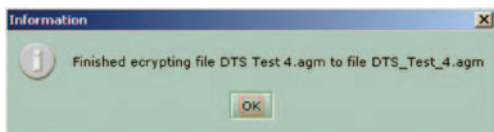


A confirmation prompt will display.



Review the choices, then click Yes to proceed.

5. A progress bar will display at the bottom of the screen while the encryption is processing, then this confirmation prompt will display when the file has been encrypted.

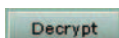


The encrypted .agm file has the name you gave it and is located in the directory you selected (in step 2).

6.1 Decrypting a File

To decrypt an encrypted file, follow this sequence

- Open the encrypted file in the DTS Pro Encrypter.
- Enter an output filename.
- Designate the output directory (or use the source directory)
- Enter the password.
- Click **Decrypt**.



The utility will decrypt the file.

7. DVD Authoring for DTS

A complete discussion of audio encoding for DTS can be found in **DVD-Video Production with DTS Coherent Acoustics Audio**, document number E818, which can be downloaded from the DTS website at:

http://www.dtsonline.com/media/uploads/pdfs/DVD_Authoring.pdf

8. Uninstalling the Software

PC Version

For the Windows version, open the Settings\Control Panel and click Add/Remove Programs . Locate the DTS Pro Series Encoder entry, highlight it and Remove it. You may also remove the WIBU runtime this way, if you wish.

Mac OS X Version

For Mac OS X, there is no uninstaller. The software can be removed by following the procedure below. Some of the files may require an administrative password for deletion. However, an upgrade installation of this software should overwrite older files. If you need to revert to an older version, you can replace a newer version by installing the older version on top of it (to overwrite it).

1. **Important:** Start by emptying the Trash folder in your Dock. You should back-up or relocate any important items from the Trash folder at this time, before any changes to the installed software are done. Also, a back-up security copy should be created at this time, before uninstalling. Please note that emptying the Trash folder will be required again at the end of this procedure to completely remove the software from your machine.
 2. From the CD-ROM, uncompress **WkRtMacX.hqx** and place the installer/uninstaller application on your desktop.
 3. Launch the application and select **Uninstall**.
 4. Quit when finished. Move the application to the Trash.
 5. Move the **/dts** folder (and all its contents) from **/Applications** to the Trash.
 6. Move **only** the following files from **/Library/Java/Extensions** to the Trash:
 - a. libDiskChecker.jnilib
 - b. libDTS.jnilib
 - c. libwibuKJni.jnilib
- ⚠ Caution:** Do **NOT** remove the **/Library/Java/Extensions** folder itself. It is required by the OS.

7. Move any aliases you manually created to the Trash.
8. Empty the Trash after deleting the above files and folder.

9. Dialog Normalization

Dialog Normalization is the use of metadata to control playback level. It has no effect on encoding or decoding. It is an instruction to playback equipment to adjust the level of all channels, post-decoding.

A single **DIALNORM** value is applied to a given program: level is not adjusted within a program. There is no compression involved. All channels are affected equally. **DIALNORM** can only attenuate.

The **DIALNORM** value entered into the encoder is the subjective average dialog level of the program, **not** the amount of playback attenuation. The subjective average dialog level is typically approximated by LeqA measurement. The correspondence between **DIALNORM** value and attenuation is given in the following table.

DIALNORM value (dialogue level, dBFS LeqA)	Attenuation (dB)	DIALNORM value (dialogue level, dBFS LeqA)	Attenuation (dB)
-31	0	-15	16
-30	1	-14	17
-29	2	-13	18
-28	3	-12	19
-27	4	-11	20
-26	5	-10	21
-25	6	-9	22
-24	7	-8	23
-23	8	-7	24
-22	9	-6	25
-21	10	-5	26
-20	11	-4	27
-19	12	-3	28
-18	13	-2	29
-17	14	-1	30
-16	15		

The purpose of **DIALNORM** is to achieve a consistent level of dialog from one program or program source to the next. End-users set volume to achieve a pleasing and intelligible level of dialog. However, dialog level varies considerably across different program types. For example, in a feature motion picture, dialog typically averages -27 dBFS LeqA in order to allow sufficient headroom for explosions and other effects. In contrast, in a news broadcast the announcer's voice may average 15 dB, closer to full scale. Various other programs will have other dialog levels appropriate to their headroom needs. If there is no compensation, the end-user will have to turn up the feature film, turn down the news broadcast, etc. With dialog normalization, a **DIALNORM** value of -27 is assigned to the movie, and a value of -15 is assigned to the newscast. The dialog levels then match on playback and no user adjustment should be necessary.

For music, which contains no dialog, **DIALNORM** may be used to set playback loudness at a level appropriate in the context of other program material, determined subjectively.

A **DIALNORM** value of -31 results in no **DIALNORM** attenuation.

For broadcast or disc authoring of a feature motion picture, if direct measurement has not indicated a different level, set the **DIALNORM** value to -27. This has been widely accepted as typical for features, and THX-certified playback equipment assumes a value of -27 in aligning levels between the home and the dubbing stage.

If more than one codec is being used for the same audio track (for example, on DVD), **DIALNORM** value should be set the same on all codecs for a given program.

For further information on DIALNORM, including typical values for different types of programs and music, see:

Tomlinson Holman, **5.1 Surround Sound Up and Running**. Boston: Focal Press, 2000. 163-167.

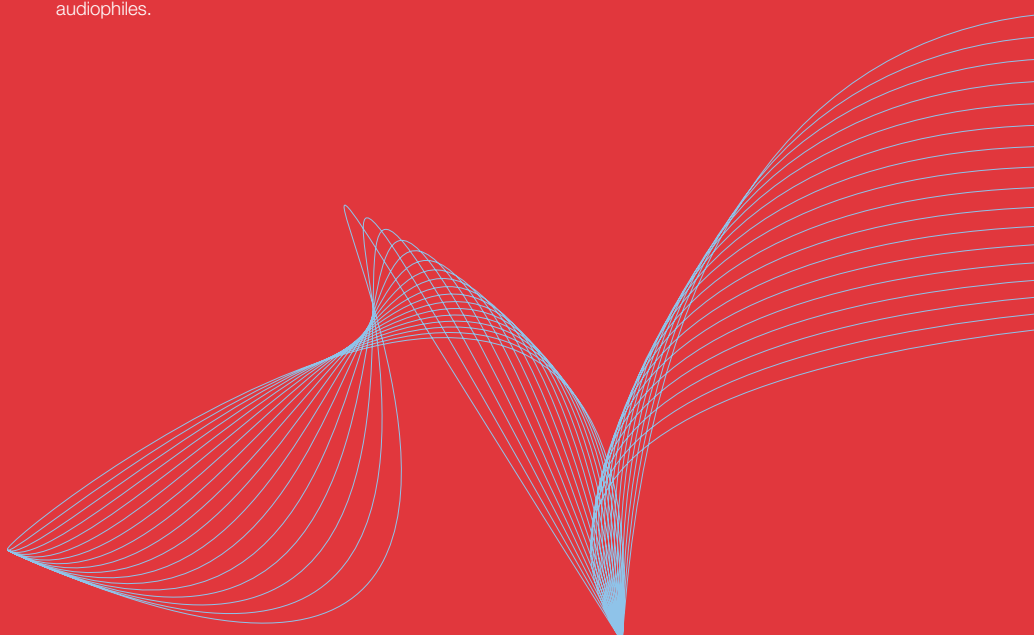
DTS Pro Series

surround encoder

A Full-Featured Suite for Today's Digital Audio Workstation

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