beDSP

User's Manual

L-NORMALIZER

Loudness Normalizer and True Peak Limiter – VST, AU, AAX plugin based on BS1770 (rev.3) and EBU R128. Now you can easily analyze and normalize your audio material as you wish.

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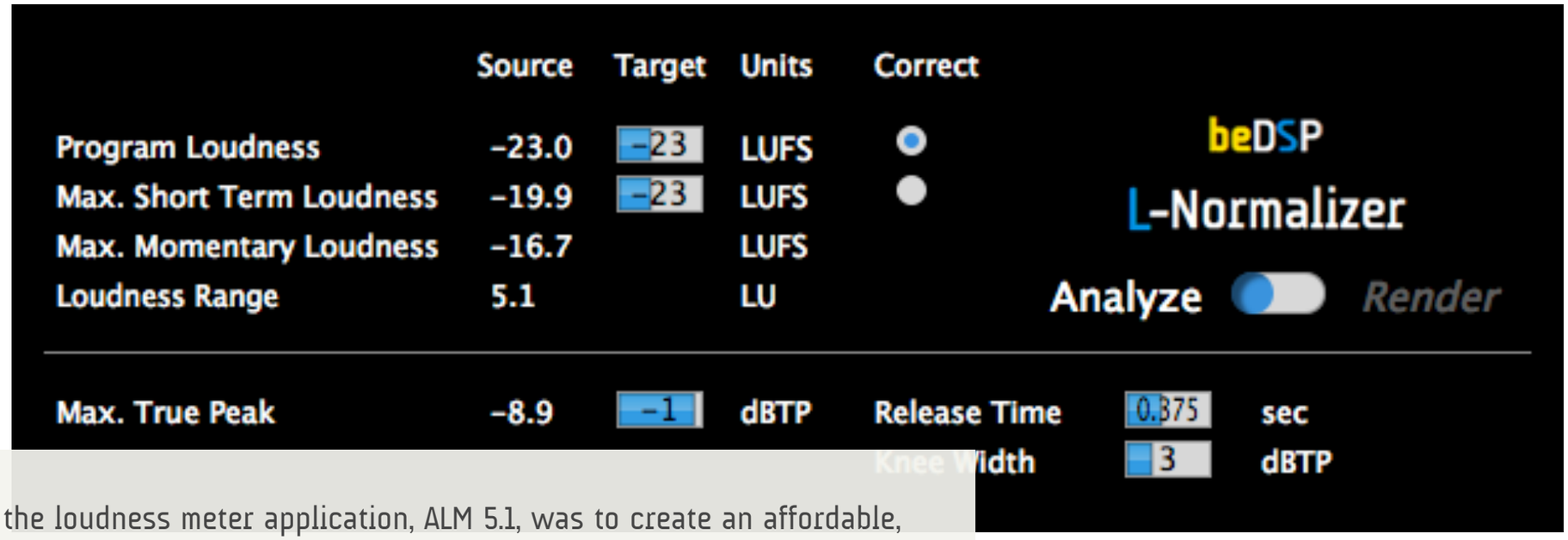
1. L-Normalizer

beDSP

Loudness Normalizer and True Peak Limiter



The next logical step after releasing the loudness meter application, ALM 5.1, was to create an affordable, cross-platform loudness normalizing tool: the **L-Normalizer**. This particular application can be very useful and helpful for audio engineers working in post production and broadcasting environments.

The major two steps of the workflow consists in analyzing the audio material and rendering an improved one. If you choose to normalize your material, you can pick between program loudness or short term loudness if your materials are shorter than 30 seconds. Also, a True Peak Limiter is available with variable knee width, release time and true peak.

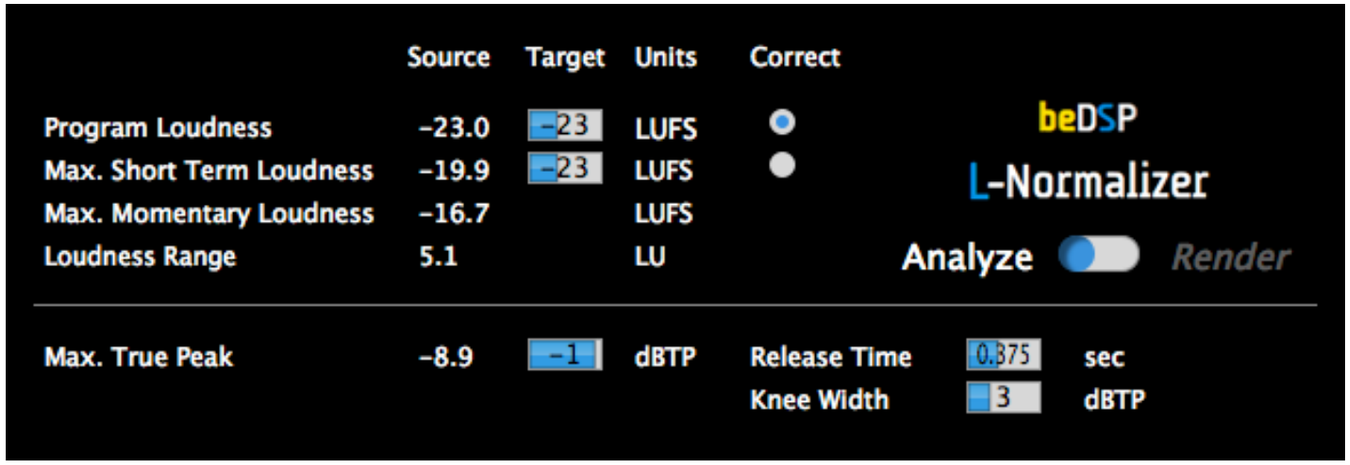


Figure 1: L-Normalizer

Plugin Features

- Loudness Normalizer and True Peak Limiter - VST, AU and AAX plugins.
- Fully compliant with international loudness standards : BS-1770 (rev.3), EBU R128 and ATSC A/85 specifications.
- Analyzing and Rendering capabilities.
- Channels Format : mono, stereo and 5.1 with automatic detection of track numbers.
- Correction for either Program Loudness or Maximum Short Term Loudness.
- Adjustable settings for True Peak Limiter: maximum true peak, release time and knee.
- It can be used as an offline plugin but also offers real time processing, if the plugin is inserted on a track.
- The True Peak Limiter ensures that no clipping occurs even when positive gain normalization is used.
- Automatic source analysis after normalization.

Descriptors

- **Integrated Loudness or Program Loudness** (in LUFS[1] or LU[2]) - describes the long-term integrated loudness of an audio material from 'start' to 'stop'.
- **Max Momentary Loudness** (in LUFS) - the maximum value of the Momentary Loudness of the entire program calculated with a time window of 400ms.
- **Max Short Term Loudness** (in LUFS or LU) - the maximum value of the Short Term Loudness of the entire program calculated with a time window of 3s.
- **Loudness Range** (in LU) – loudness dynamic range from 'start' to 'stop' that helps you decide if dynamic compression is necessary.
- **Max True Peak Level** (in dBTP[3]) - indicates the maximum value of the signal waveform in the continuous time domain (this value is calculated using inter-sample peaks that can be missed in quantization).
- **Release Time** (in sec) - the time it takes to turn up the level again after the signal peaked.
- **Knee Width** (in dBTP) - controls whether the bend in the limiter characteristic has a sharp angle or has a rounded edge. The Knee Width is the threshold-determined point where the limiter becomes on.

1. LUFS - Loudness, K-Weighting, referenced to digital Full Scale
2. LU - Loudness Units: 1 LU ≡ 1 dB
3. dBTP - deciBel referenced to digital Full Scale measured with a True Peak meter

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Minimum System Requirements

MAC:
Dual Core CPU (Intel or AMD) with SSE2 support
2GB RAM
OSX 10.6

PC:
Dual Core CPU(Intel or AMD) with SSE2 support
2GB RAM
Windows 7

Available Formats

MAC:
VST 2.4 universal binary (32/64bits)
AU universal binary (32/64bits)
AAX (64bits)

PC:
VST 2.4 universal binary (32/64bits)
AAX (64bits)

Thank you for choosing L-Normalizer!
Once you have downloaded the package **L-NormalizerBundle** and you own a serial number, please follow the next steps for installation (for OSX or Windows) and authentication of your product.

OSX Installation

1. Double click on the icon **L-NormalizerBundle.mpkg** and an installation window will appear (see Figure 2). Press the **Continue** button to **start** the installation;

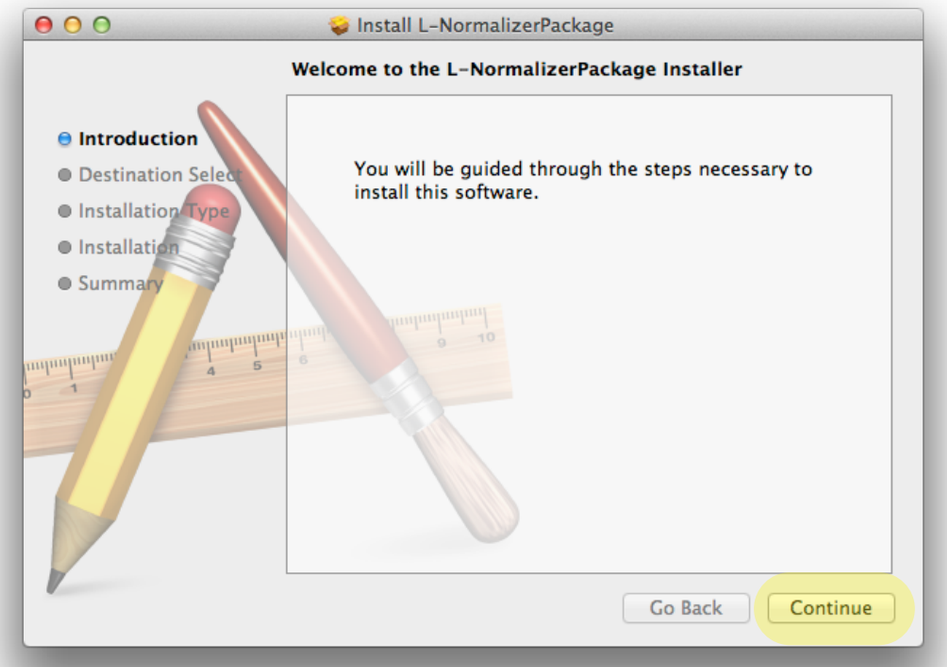

Figure 2: Installation Start

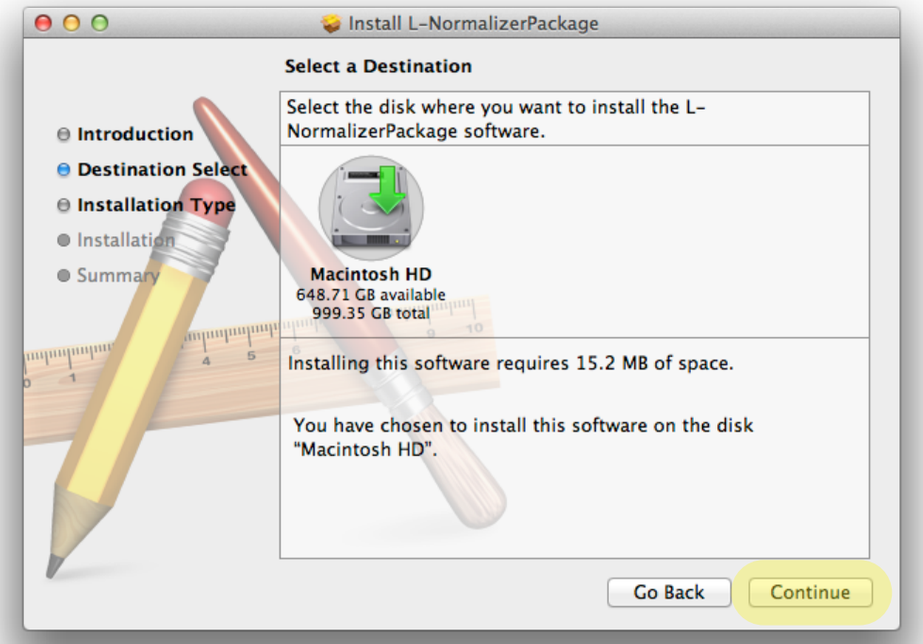

Figure 3: The Install Location

2. **Select a Destination** for the installation (see Figure 3) and then press the **Continue** button;

3. An information message will appear. Press the **Install** button if you have the necessary free **space** for a proper installation (see Figure 4) or **Customize** for Custom Install (see Figure 5);

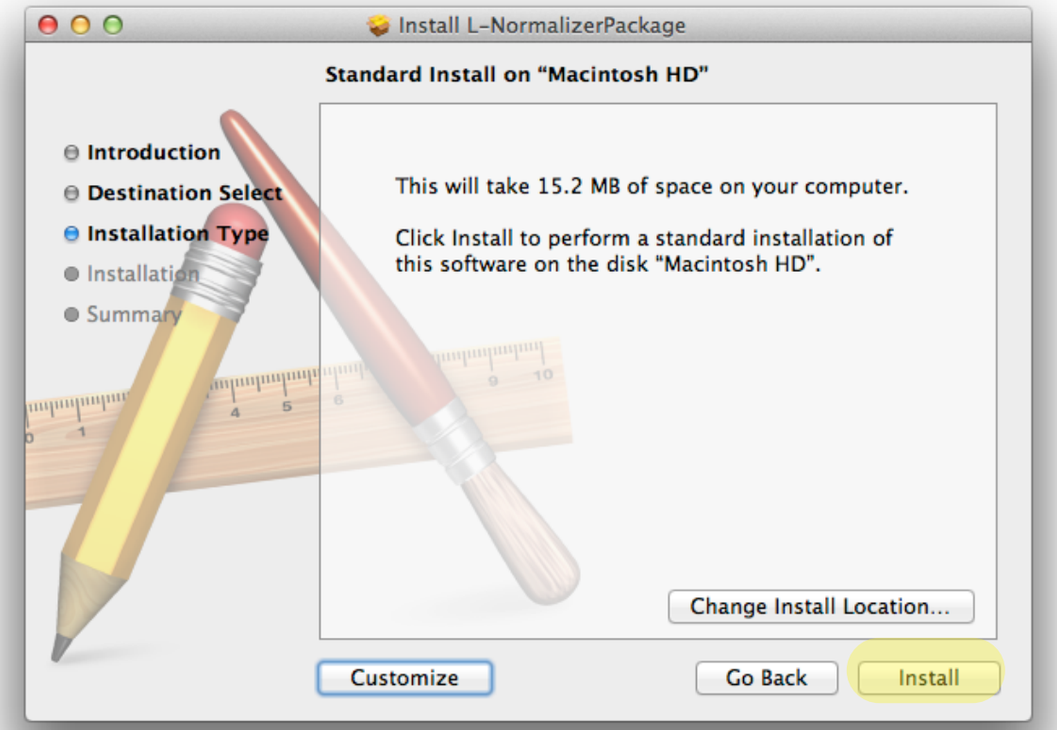

Figure 4: Installation Type

4. Wait until the installation is completed and a confirmation window appears (see Figure 6). Press the **Close** button and pass to the **Authentication** part.

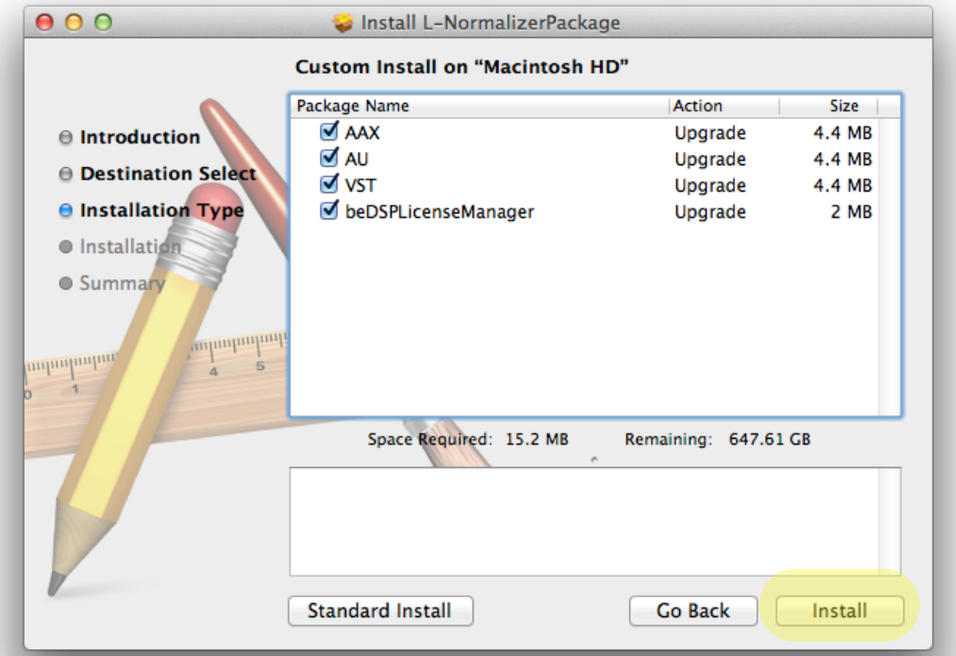

Figure 5: Free space necessary for the installation

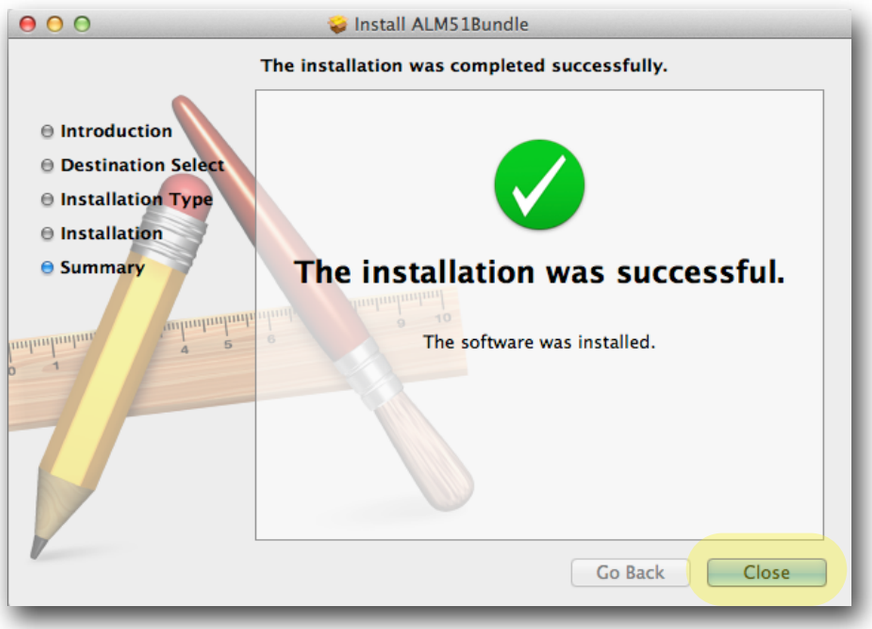

Figure 6: Installation completed

Windows Installation

Figure 7: Setup window

1. Double click on the icon L-NormalizerBundle1.0.0_x86 and a setup window will appear (see Figure 7). Press the **Next** button to continue the setup;
2. When the setup is ready to begin installing L-Normalizer on your computer (see Figure 8), press the **Install** button.
3. Press the **Finish** button to exit the Setup. You have the possibility to automatically launch the L-Normalizer application (see Figure 9).

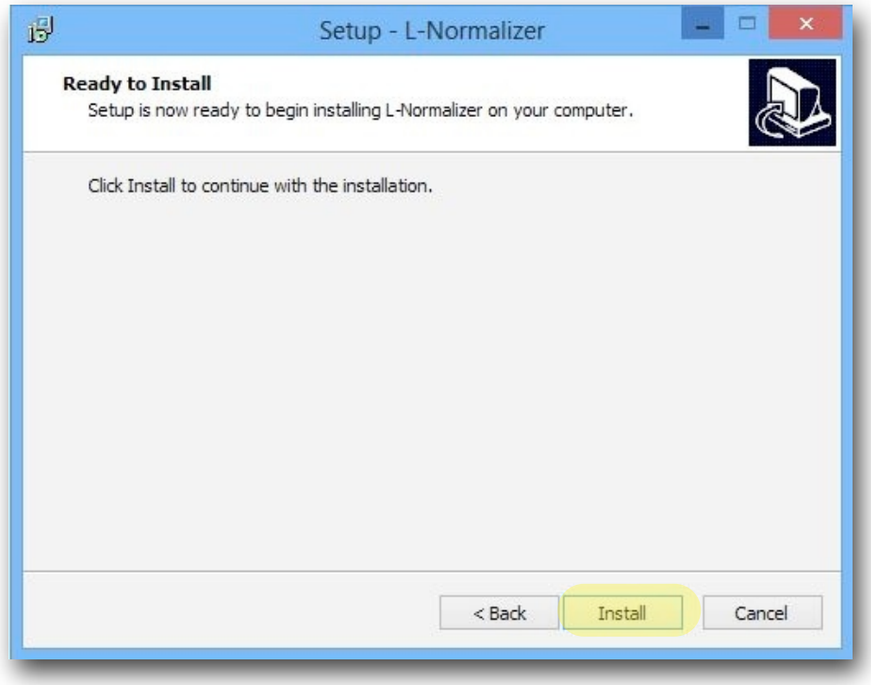

Figure 8: Installation start

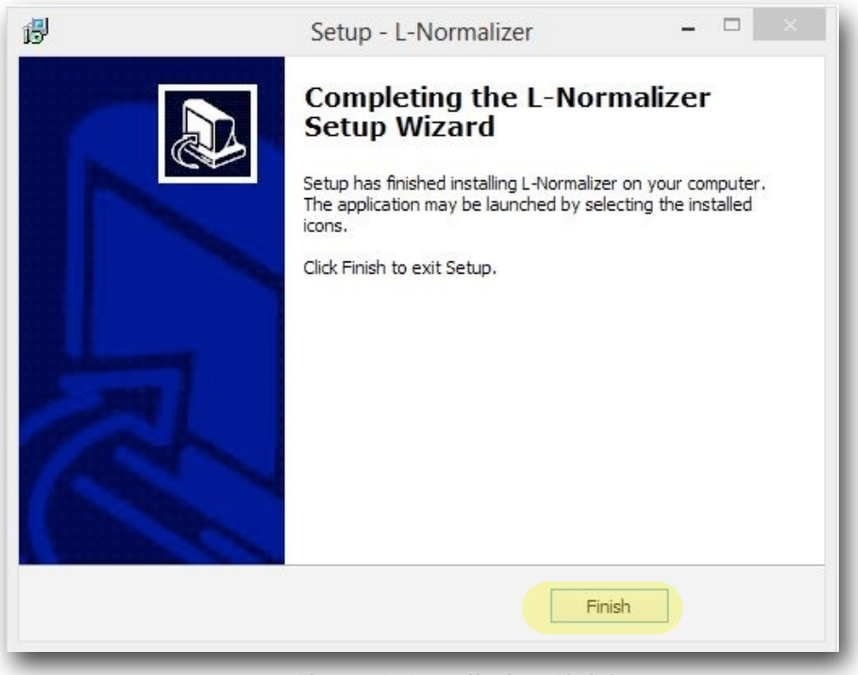

Figure 9: Installation Finish

Authentication

Go to the **Applications/ProgramFiles** where you will find the **beDSP** folder.
Double click on the beDPSLicenseManager icon and the main menu window will appear (see Figure 10) with three available options: **Online Activation**, **Offline Activation** and **Trial Request**. For any type of activation you must have a beDSP account.
If you don't have one, go to *www.bedsp.net/sign-up* and create your account.

Online Activation

1. If you have an internet connection, select **Online Activation**, otherwise you will have to select **Offline Activation** (see Figure 10).
2. If you want to activate the application on your computer, select **For this computer** (see Figure 11).

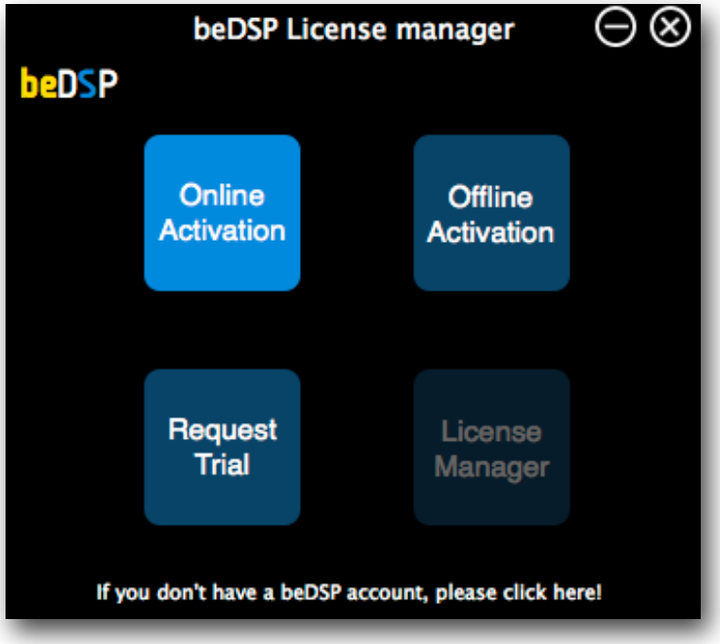

Figure 10: Main menu

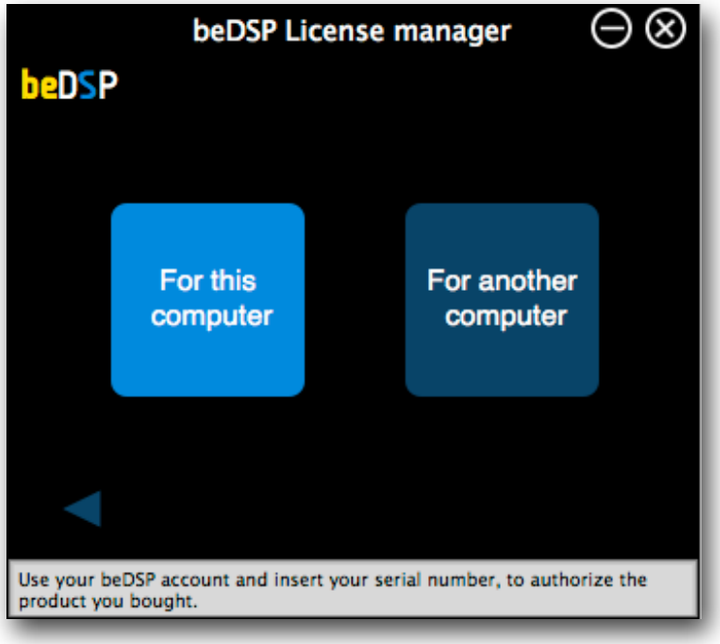

Figure 11: Online Activation options

3. An authentication window will appear (see Figure 12) .
Insert your beDSP username (same as your e-mail), password and serial number.

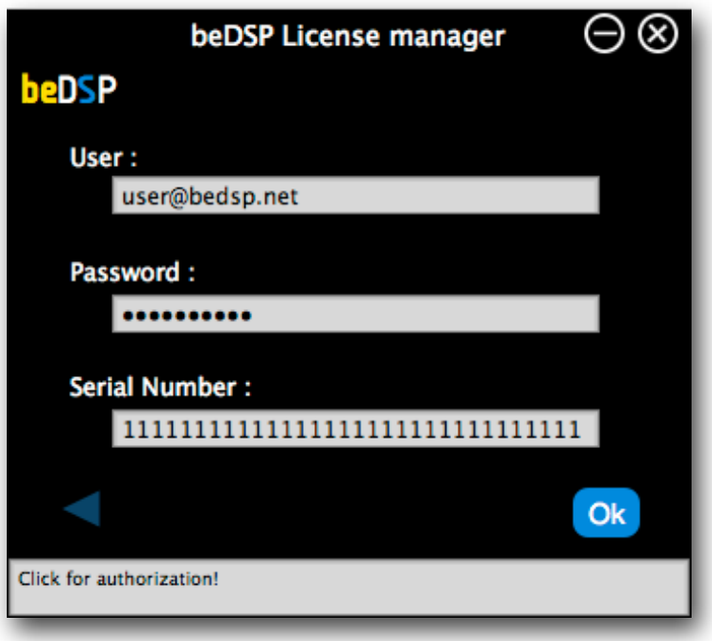

Figure 12: Authentication window

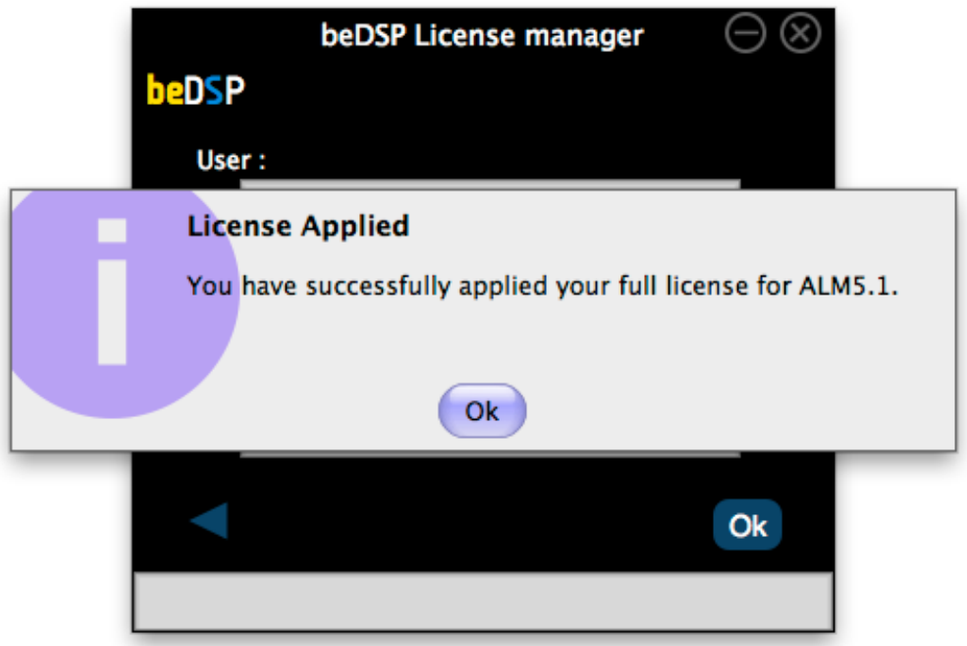

Figure 13: Confirmation window

4. A confirmation window will appear, that specifies the name of the product you have just activated and the type of license (see Figure 13).
Press **OK** and enjoy your product!

Offline Activation

If you don't have an internet connection, select **Offline Activation** from the main menu (see Figure 10), then **Generate Request** (see Figure 14).

1. Insert your serial number and select the folder where you want to save your license request.
2. After clicking ok, your license request will be saved. A window containing the license request will be revealed.
3. Copy your license request on a flash drive or any data storage device and move it on the online computer (this second computer must have the beDSP license manager installed and an internet connection so you can continue your activation).

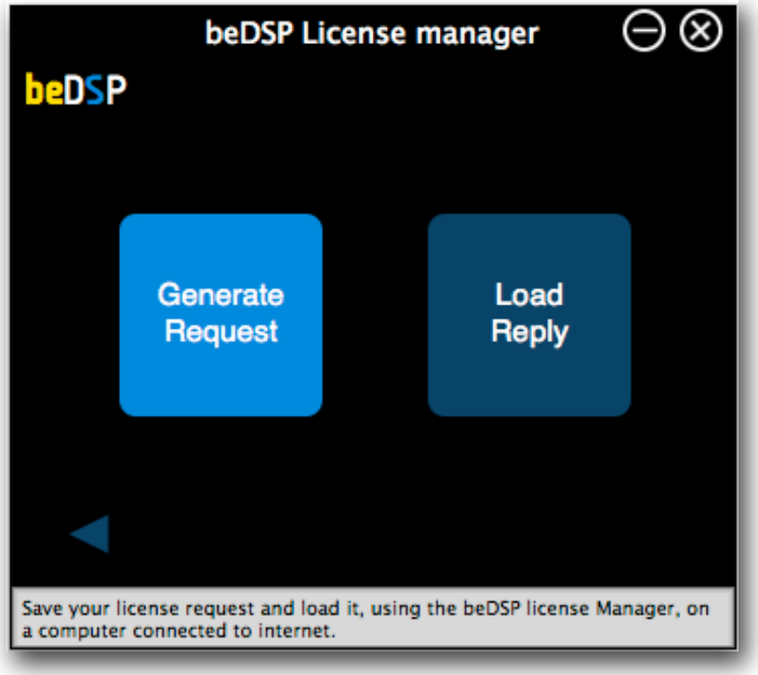

Figure 14: Offline Activation options

Figure 15: Generating the license request

4. From the **Online Activation** menu, pick **For Another Computer** (see Figure 11).

5. In the authentication window (see Figure 16), insert your beDSP username (same as your e-mail), password and load your license request. Click ok for authorization.

6. A folder with the license reply will be revealed, named "LicensesToMove". This folder is saved in the same place you've copied your license request. Now move your license reply on the computer you wish to authorize.

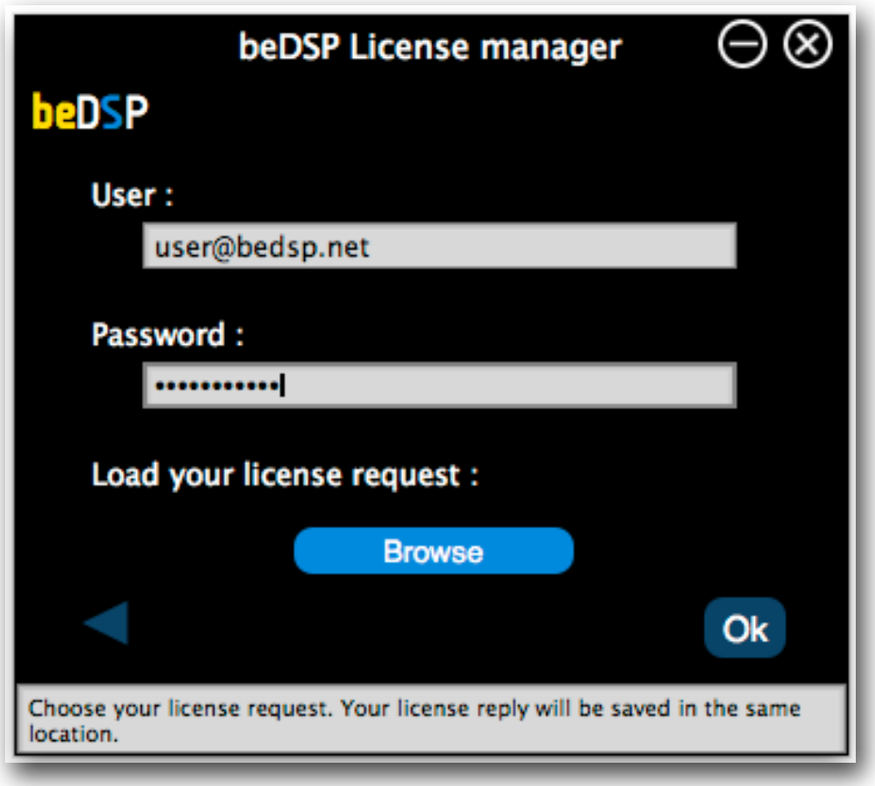

Figure 16: Authorizing your license request

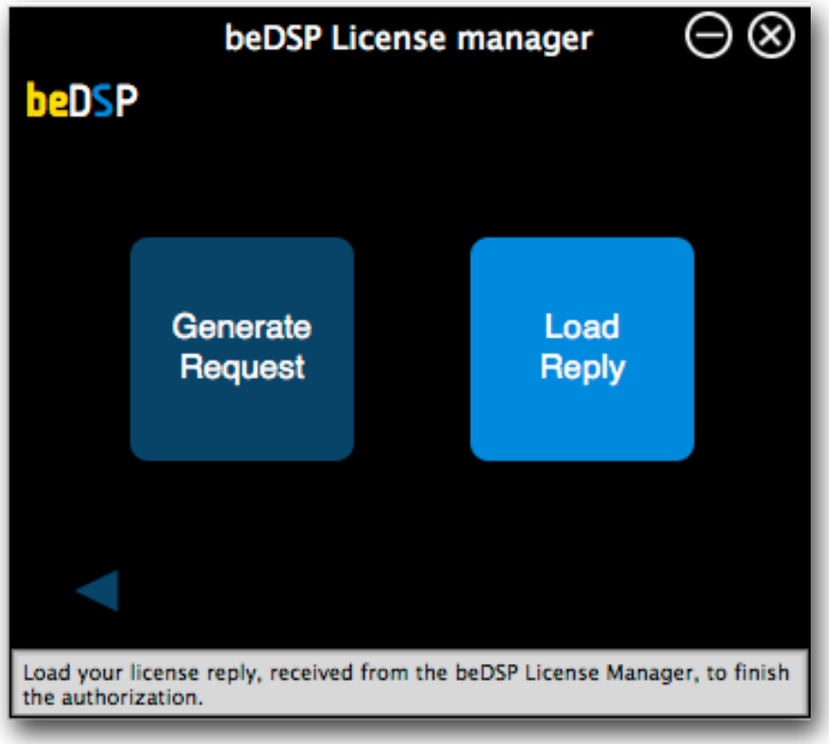

Figure 17: Loading your reply

7. Back on your computer, from the main menu (see Figure 10), pick **Offline Activation**, then choose **Load Reply** (see Figure 17).
   A browser window will open and you have to select your reply.

8. After loading your reply, a confirmation window will appear, like the one from Figure 13. Press **Ok** and enjoy your product!

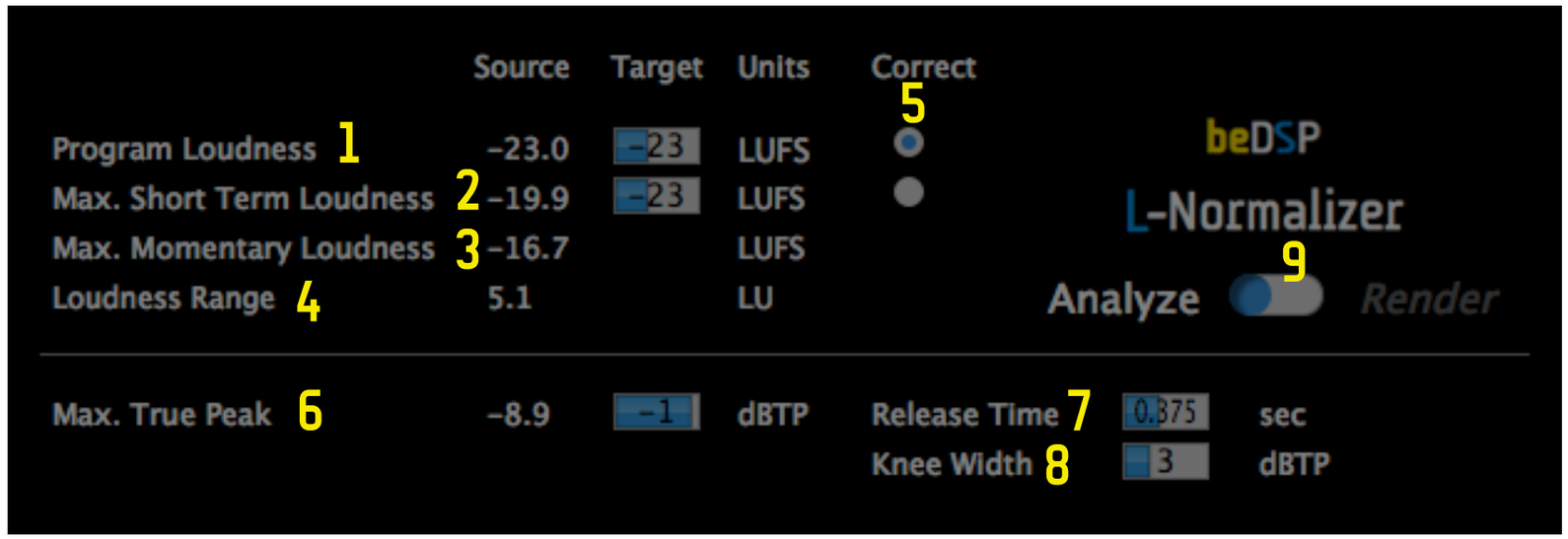

Figure 18: Interface

3.1 Interface

1. **Integrated Loudness or Program Loudness** (in LUFS), both Source and Target values..
2. **Max. Short Term Loudness** (in LUFS), both Source and Target values.
3. **Max. Momentary Loudness** (in LUFS).
4. **Loudness Range** (in LU).
5. The **Correction** parameter for normalization: Program Loudness or Max. Short Term Loudness.
6. **Max. True Peak** (dBTP), both Source and Target values.
7. **Release Time** (in sec).
8. **Knee Width** (in dBTP).
9. **Analyze** or **Render** processing.

3.2 The normalization algorithm

For normalization, you will need to set your target values:

- **Target Program Loudness (LUFS)** – the target value of *Program Loudness* : Europa **-23.00**, America **-24.00**, or any value you need (from -30.0 to -12.0).
- **Target Max SL (LUFS)** - target value of *Max Short Term Loudness:* usually **-20.00**, but you can choose any value you need (from -30.0 to -12.0).
- **Target Max TP (dBTP)** – target value of *Max True Peak* : usually **-1.00**, but you can choose any value you need (from -12.0 to 0.0).
- **Release Time (sec)** - the Release Time of the True Peak Limiter (from 0.025 to 2).
- **Knee Width (dBTP)** - the Knee Width of the True Peak Limiter (from 0 to 10).

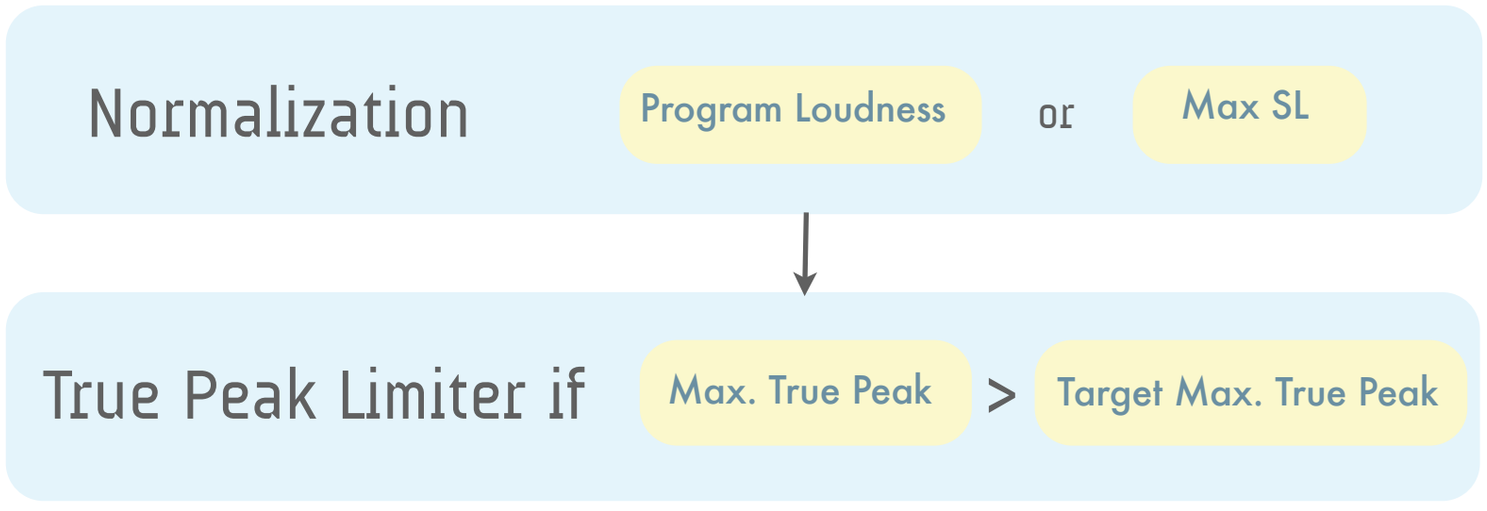

Figure 19: The normalization algorithm

Several different scenario are possible (see Figure 19):

a. Normalization after the Program Loudness parameter

a.1. First it is necessary to calculate the gain defined as:

$$\text{Gain}_{Lk}\,(dB) = L_K \text{ target} - L_K \text{ measured}$$

If the measured Program Loudness is lower than the target value, the gain will be positive, and if it is wider, the gain will be negative. The normalization only consists in the amplification or attenuation of the entire program with the gain obtained above, Gain_{Lk} .

a.2. After normalization, it is necessary to verify if the Max. True Peak Level exceeds its correspondent target value. If it exceeds, the True Peak Limiting block is applied to obtain a lower Max. True Peak(1).

b. Normalization after the Max. SL parameter

b.1. First it is necessary to calculate the gain defined as:

$$\text{Gain}_{SL}\,(dB) = \text{Max SL target} - \text{Max SL measured}$$

If the Max SL measured is greater than the target value, the gain will be negative and the normalization resumes at an attenuation of the entire program with the gain obtained above GainSL. If the Max SL measured is lower than the target value, the audio material will not be changed.

b.2. Also, it is necessary to verify if the Max. True Peak Level exceeds its correspondent target value. If it exceeds, the True Peak Limiting block is applied to obtain a lower Max. True Peak(1).

After the normalization is done, C-Normalizer creates two log files of the program material, for evaluation and quality control of the descriptors (Program Loudness, Max. SL, Max. ML, LRA and Max. True Peak) with their time code position for both source and target.

1. Note that after the True Peak Limiting block, the Program Loudness Level will not be perfectly equal with the Program Loudness Level desired.

3.3 Recommended Workflows

The workflow consists of 3 steps: **analyzing**, **setting the target values** and **rendering**.
The L-Normalizer plug-in is capable of working with **mono**, **stereo** or **5.1 clips**, so make sure to import your material on a track with the correct channel count. If you choose to normalize your material, you can pick between **Program Loudness** or **Short Term Loudness** (if your materials are shorter than 30 seconds).

In the next pages you will find the necessary steps for normalizing audio clips with the beDSP L-Normalizer:

- Pro Tools (1-see Page 20);
- Nuendo (2-see Page 22);
- Premiere Pro (3-see Page 24);

Pro Tools

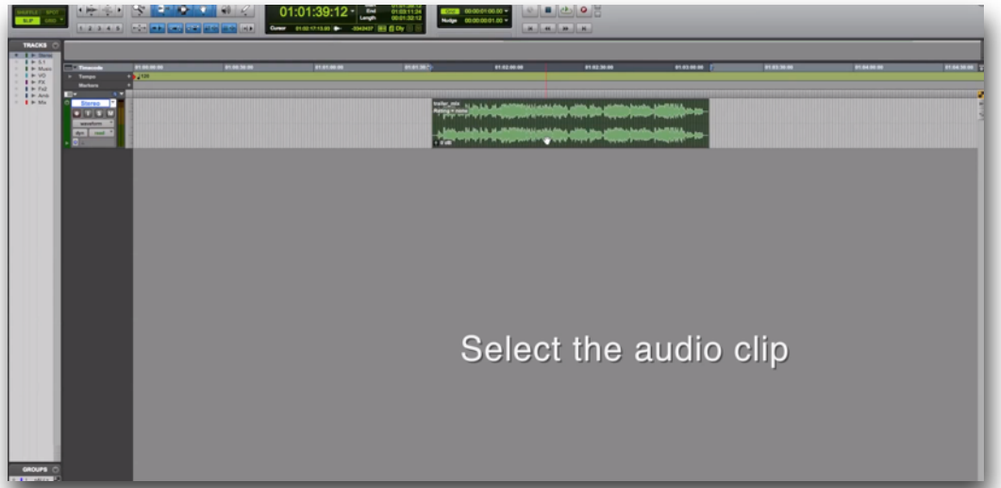

Figure 20: Select the audio clip

a. Select the audio region (see Figure 20) and then load the plug-in from the Audio Suite top menu (see Figure 21). Sometimes the plug-in will display values from pre-views sessions, simply double-click the Analyze-Render slider under L-Normalizer for a complete reset.

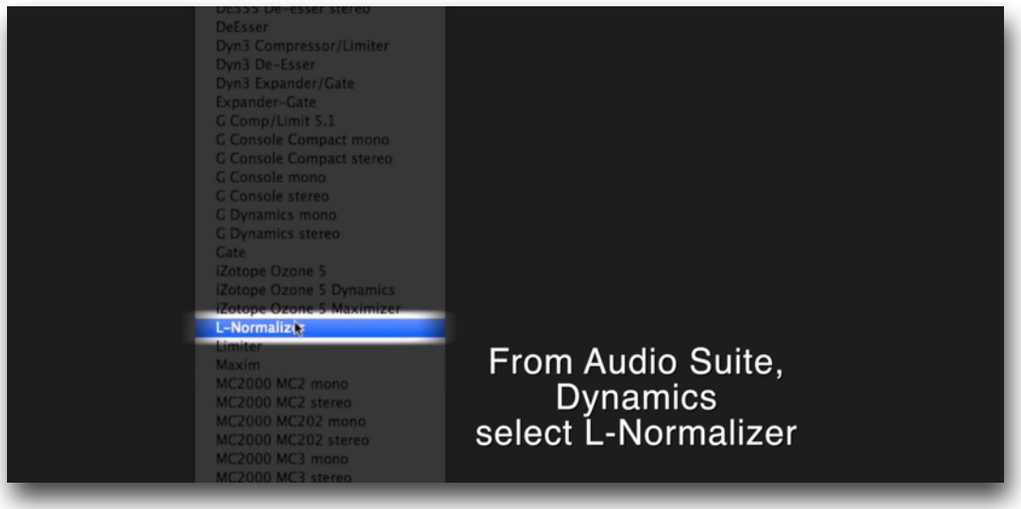

Figure 21: Select L-Normalizer

b. With the slider set on **Analyze**, click the **Render** button from the lower right corner (see Figure 22). After rendering, a detailed report will be displayed under the Source label with values for Program Loudness, Maximum Short Therm Loudness, Maximum Momentary Loudness, Loudness Range and Maximum True Peak (see Figure 23).

Figure 22: Analyzing Mode

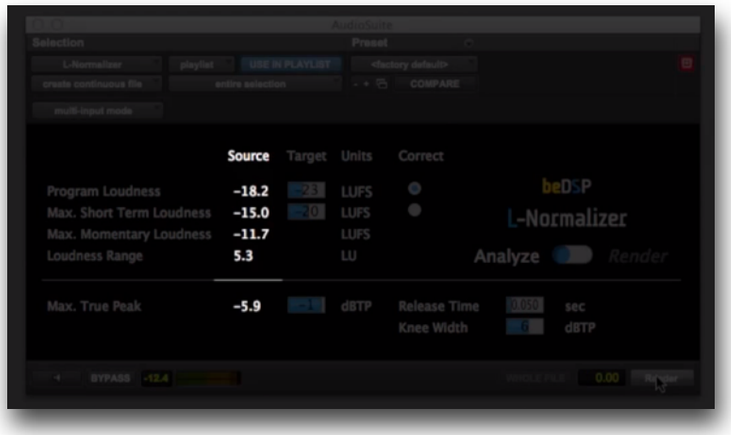

Figure 23: Source Values

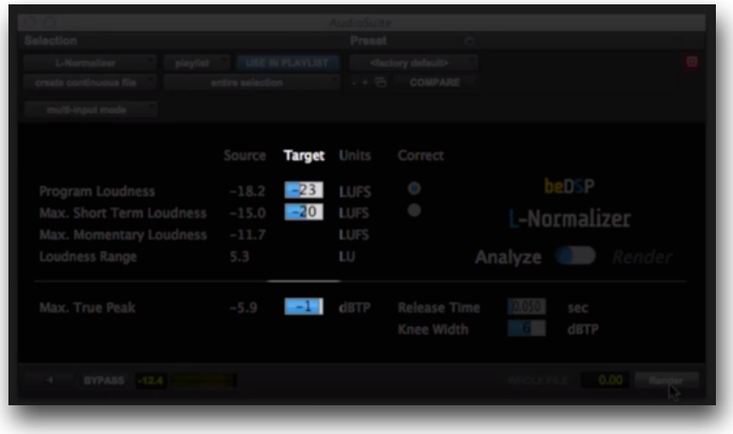

Figure 24: Target Values

c. A typical EBU compliant file will need to have a program **loudness** of **-23 LUFS**, with a **max true peak** of **-1 dBTP**. Now you can set the target values for normalization (see Figure 24) and then click on the Analyze-Render slider (see Figure 25). Be advised: after switching to render mode the target values will be locked. If you want to return to analyze mode, the source values will be reset and a new analysis will be needed.

d. Once you click on the Render button, the plug-in will normalize the file and do a final analysis. You can check the values under the Source label for the new loudness measurements.

! **Be advised**: if heavy true peak limiting occurs the program loudness will not be 100% accurate.

For 5.1 file formats you need to make sure that the clip is on a 5.1 track and not split into multi mono channels.

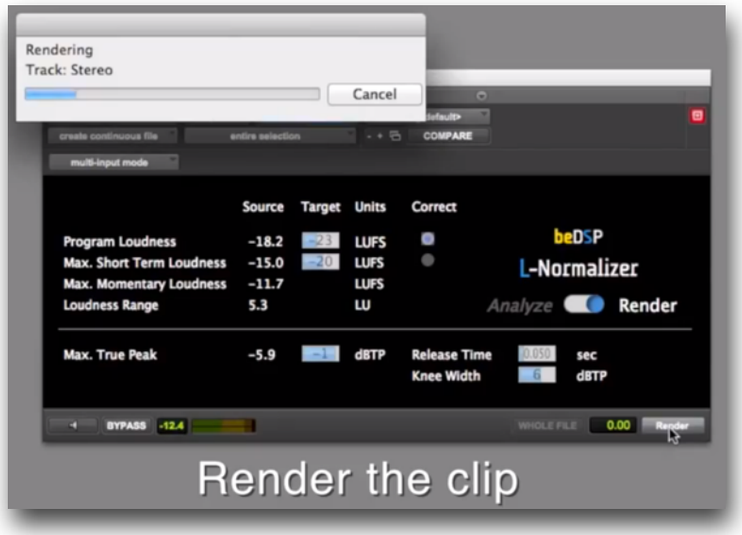

Figure 25: Rendering Mode

2. Nuendo

a. Select the audio region (see Figure 26) and then load the plug-in from the Audio top menu (see Figure 27). Sometimes the plug-in will display values from previews sessions, simply double-click the Analyze-Render slider under L-Normalizer for a complete reset.

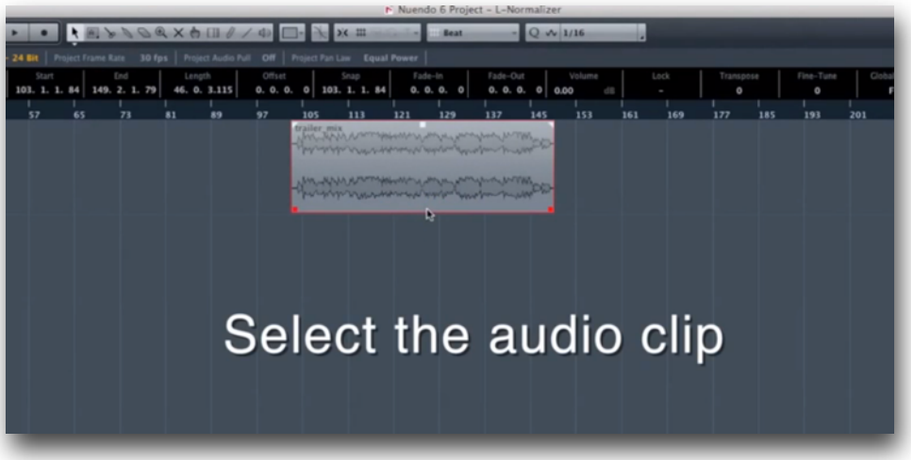

Figure 26: Select the audio clip

b. With the slider set on **Analyze**, click the **Process** button from the lower right corner (see Figure 28).

! **Don't panic**: The Nuendo Engine will atomically close the plug-in when processing.

Simply reload the plug-in and a detailed report will be displayed under the Source label with values for Program Loudness, Maximum Short Therm Loudness, Maximum Momentary Loudness, Loudness Range and Maximum True Peak (see Figure 29).

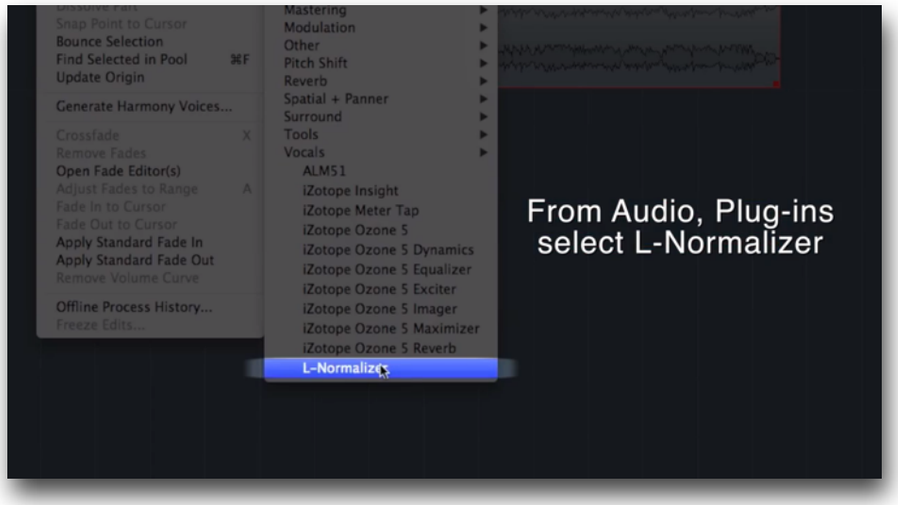

Figure 27: Select L-Normalizer

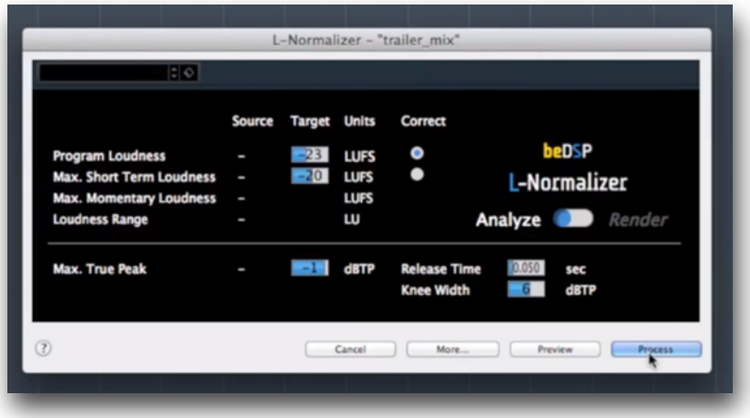

Figure 28: Analyzing Mode

Figure 29: Source Values

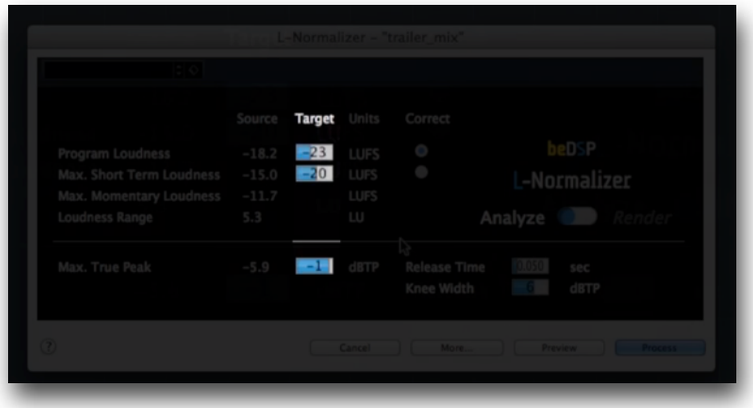

Figure 30: Target Values

c. A typical EBU compliant file will need to have a program **loudness** of **-23 LUFS**, with a **max true peak** of **-1 dBTP**. Now you can set the target values for normalization (see Figure 30) and then click on the Analyze-Render slider (see Figure 31).

d. Once you click on the Process button, the plug-in will normalize the file and do a final analysis. You can check the values if you reopen the plugin, under the Source label for the new loudness measurements.

! **Be advised**: if heavy true peak limiting occurs the program loudness will not be 100% accurate.

For 5.1 file formats you need to make sure that the clip is on a 5.1 track and not split in to multi mono channels.

Figure 31: Rendering Mode

Premiere Pro

a. From the Effects Tab, under Audio Effects, select the L-Normalizer plug-in (see Figure 32) and drop it on the audio clip. You will find two L-normalizer plug-ins, one for mono and stereo files and the other for 5.1 files. Under the Effects Controller Tab, click on the edit button to access the plug-in interface. Sometimes the plug-in will display values from previews sessions, simply double-click the Analyze-Render slider under L-Normalizer for a complete reset.

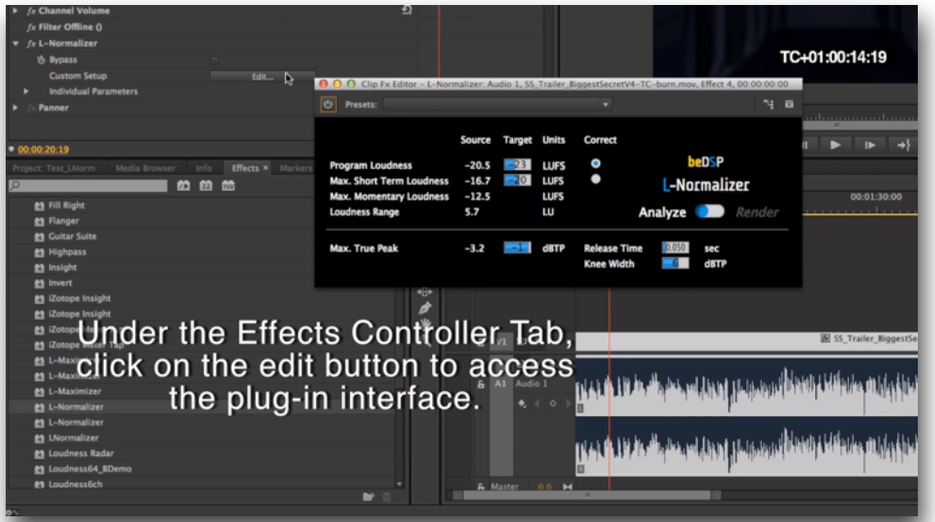

Figure 32: Select L-Normalizer

b. Premiere Pro engine doesn't feature an offline audio processor. So, in order to analyze the file, you will need to export it to your hard drive in an audio format with the correct channel count (see Figure 33). After exporting, simply remove the plug-in from the Effects Control tab and reloaded from the Audio Effects menu. After clicking the edit button a detailed report will be displayed under the Source label with values for Program Loudness, Maximum Short Therm Loudness, Maximum Momentary Loudness, Loudness Range and Maximum True Peak (see Figure 34).

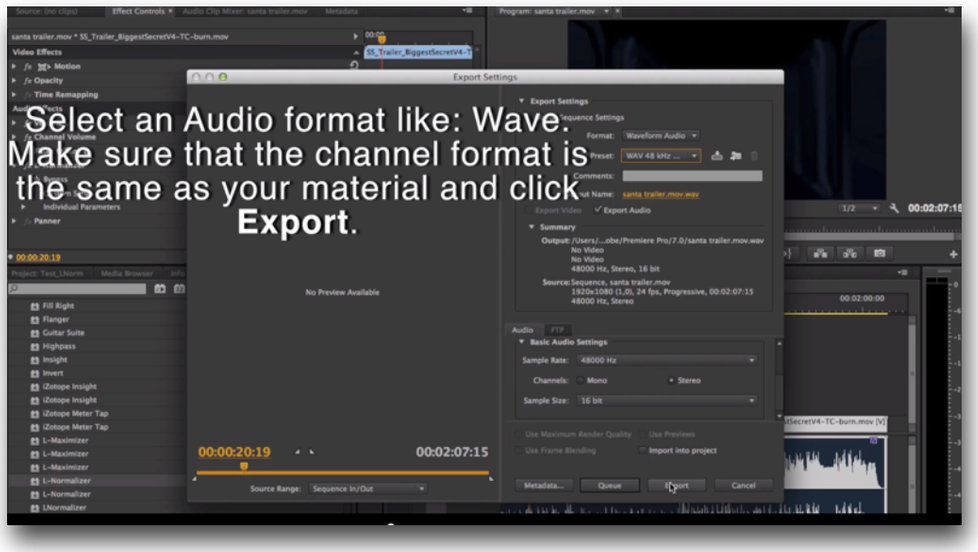

Figure 33: Analyzing Mode

Figure 34: Source Values

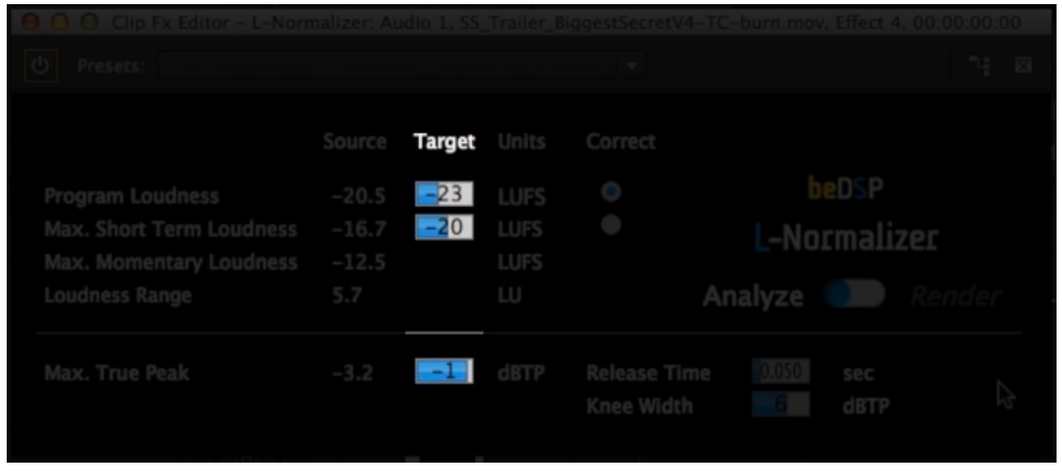

Figure 35: Target Values

c. A typical EBU compliant file will need to have a program **loudness** of **-23 LUFS**, with a **max true peak** of **-1 dBTP**. Now you can set the target values for normalization (see Figure 35) and then click on the Analyze-Render slider.

d. Now you can check the file playing it or export a video master file with a loudness compliant audio track.
Be advised: in playing mode the target values will be locked (see Figure 36). If you want to return to analyze mode, the source values will be reset and a new analysis will be needed.

! **Be advised**: if heavy true peak limiting occurs the program loudness will not be 100% accurate.

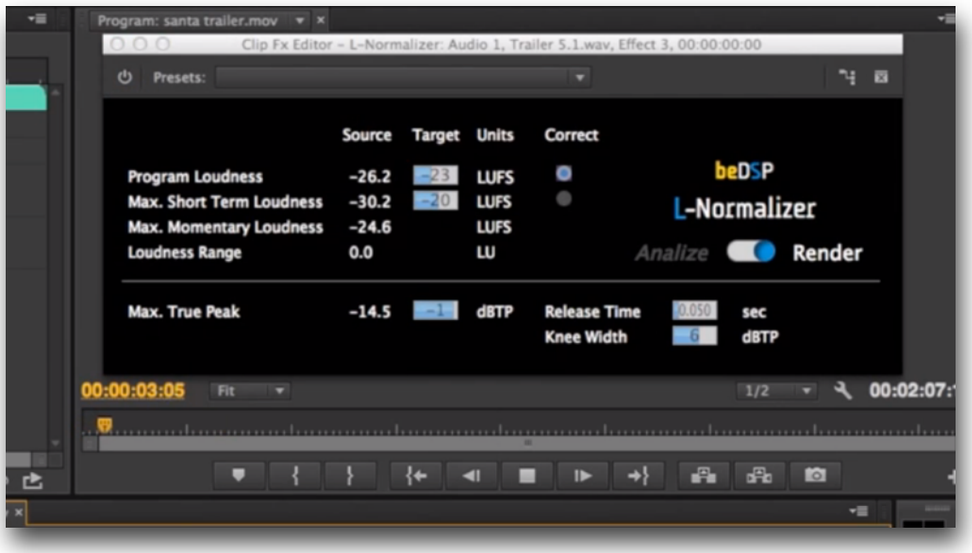

Figure 36: Rendering Mode

L-Normalizer Software License Agreement

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beDSP

L-Normalizer

Loudness Normalizer and True Peak Limiter VST, AU and AAX plugin based on BS1770 (rev.3) and EBU R128.

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