tc electronic ®

Source   Process

-18.0 Int LUFS   -23.0
  7.2 LRA LU   7.2
-12.9 SMax LUFS -17.8
 -0.5 TPMax dBTP -5.5

00:01:28 Stereo Full Circle: 4 min

Preset	EBU R128 Nrml ▼	
Max Boost	12.0 dB	
Max Reduction	-18.0 dB	
Surr. Ch. Order	SMPTE/ITU ▼	

Target	-23.0 LUFS
SMax	Disregard
TP Limiter Threshold	-1.0 dBTP
TP Limiter Profile	Linear PCM ▼

LC6n Loudness Correct   tc electronic

Product	LCn
Product version	1.1
Document	Manual
Document version/date	2015-03-01

Introduction

About this manual

Read this manual to learn how to install and use your TC Electronic software.

This manual is only available in PDF format from the TC Electronic website.

You can print this manual, but we encourage you to use the PDF version, which has both internal and external hyperlinks. For example, clicking the TC Electronic logo in the upper left corner of each manual page will take you to the table of contents.

To get the most from this manual, please read it from start to finish, or you may miss important information.

To download the most current version of this manual, visit the web page

tcelectronic.com/support/manuals/

Loudness website

Keeping track of the multitude of issues around loudness can be a challenge. That's why we have created a one-stop dedicated loudness website where you'll find critical information on the most important issues. This site is an answer to the highly relevant question:

"What is loudness, and why is it important?"

Visit the Loudness website at
tcelectronic.com/loudness/

Getting support

If you still have questions about your TC Electronic product after reading its manual, please get in touch with TC Support:

tcelectronic.com/support/

System requirements and installation

System requirements

Two plug-in versions
Please note that there are two versions of this plug-in:

– **LC2n:** for processing mono and stereo signals
– **LC6n:** for processing mono, stereo and 5.1 surround signals

This manuals refers to both LC2n and LC6n as "LCn", unless a description only applies to one version.

System requirements for Mac OS X
– Intel CPU (2 GHz or faster recommended)
– 2 GB RAM
– Mac OS X version 10.6.8 or higher
– Pro Tools version 8 or higher
  (for the plug-in version)

Supported plug-in formats
– AAX AudioSuite (32 Bit/64 Bit)
– RTAS AudioSuite (32 Bit)

System requirements for Windows
– Intel-compatible CPU
  (2 GHz or faster recommended)
– 2 GB RAM
– Windows version 7 or higher
– Pro Tools version 8 or higher
  (for the plug-in version)

Supported plug-in formats
– AAX AudioSuite (32 Bit/64 Bit)
– RTAS AudioSuite (32 Bit)

Supported hosts
You can use LCn either as a native Pro Tools plug-in or as a stand-alone version.

You can use the plug-in version of LCn with:
– Avid Pro Tools 8 & 9 (Mac & PC): RTAS
– Avid Pro Tools 10 & 11 (Mac & PC): AAX

For more information, see "Pro Tools and stand-alone versions".

Supported sample rates
(Applies to plug-in and stand-alone versions)
– 44.1 kHz
– 48 kHz
– 96 kHz

Supported audio formats
– LC2n: Mono, Stereo
– LC6n: Mono, Stereo, 5.1 Surround

Supported file formats
You can use the stand-alone version of LCn to process the following audio file formats:
– WAV
– Broadcast WAV
– AIFF

The stand-alone version of LC6n can process 5.1 surround recordings stored as discrete mono files if these files follow Pro Tools naming conventions. For more information, see "Processing of 5.1 surround files in LC6n (stand-alone version)" on page 11.

Installation and authorization
You may be familiar with software licensing and authorization based on the iLok hardware. LCn uses a new license management concept/technology that allows you to authorize your plug-ins *without* a physical iLok key.

Instead of the iLok key, you can use your computer as a "key". All you need is a (free) **iLok ID,** and the license(s) you purchase will be associated with this ID.

You then install the **iLok License Manager** software on your computer and use your iLok ID to activate the plug-in(s) you have purchased on this computer. Licenses can later be deactivated and then activated on another computer, allowing you to easily use your LCn wherever you need it. No iLok key to lose – one less thing to worry about.

During installation, both the plug-in version for Pro Tools and the stand-alone version of LCn will be installed on your computer. Your license covers both product versions, but you cannot activate and use the plug-in and stand-alone versions on two different computers simultaneously. If you want to use LCn on another computer, you need to deactivate your license on the first computer and activate it on the second computer.

Of course, you can still use an iLok 2 device to store your licenses if this is what you prefer. In that case, you can use your license on another computer simply by attaching your iLok 2 to it.

Obtaining an iLok ID

Please note that you only need to create one account for *all* your PACE-based software licenses. If you already have an iLok ID, proceed with "Obtaining and installing the iLok License Manager" on page 5.

– Go to the iLok website: www.ilok.com
– Click on "Create Free Account".
– Fill the Free Account Setup form and click "Create Account".

After finishing the registration process, a confirmation message will be sent to the e-mail account that you have specified when registering on the iLok website. You can now use this account to log into the iLok website and activate software licenses on your computer using the **iLok License Manager** application.

Obtaining and installing the iLok License Manager

Please note that describing all iLok License Manager features is beyond the scope of this manual. If you need more information on account management, activation, deactivation and transfer of licenses, please install the iLok License Manager as described below and refer to its Help file or go to
www.ilok.com/support.html

– Go to the iLok website to download the iLok License manager:
www.ilok.com
– Download the iLok License Manager installer for your operating system.

– After downloading the iLok License Manager installer, unZIP it and run it.
– Follow the iLok License Manager installer's instructions. During installation, you may be asked to enter your user account password.
– After the installer is finished, launch the iLok License Manager.
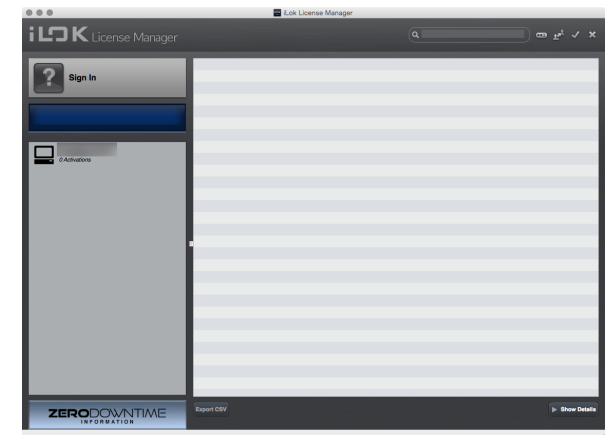

Fig. 1.: The iLok License Manager

– Click on "Sign in" and provide the credentials (your account name and your password) that you entered when you created your iLok ID.
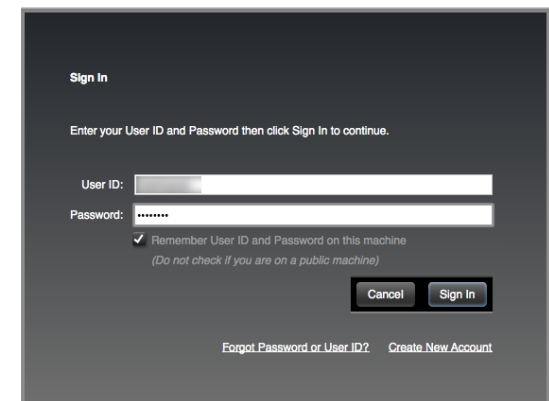

Fig. 2.: iLok License Manager: Sign In dialog

Managing plug-in activation

– After signing in, the plug-ins that were registered to your iLok ID will be available for activation and deactivation.
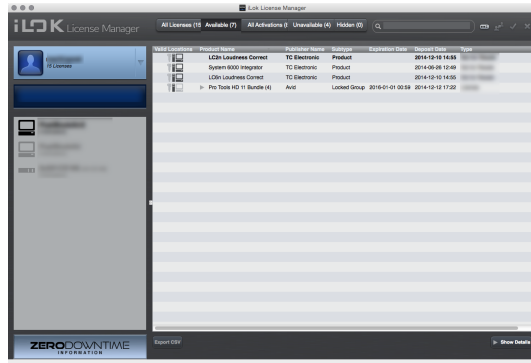

Fig. 3.: iLok License Manager after signing into an account

– Select a plug-in in the license list.
– Click on "Show Details" to display additional information, including options to Activate and Deactivate your plug-in(s).

Activating your plug-in from the iLok License Manager

To activate your plug-in from the iLok License Manager, proceed as follows:
– Select the plug-in in the license list.
– Click on "Show Details".
 Additional information about the plug-in and a sidebar with license-related functions will be shown.

Fig. 4.: iLok License Manager with details for a LC6n license

– Click on "Activate".
– In the next dialog ("Select an activation location"), select the activation location (the computer or your iLok 2 device) and click "Next".

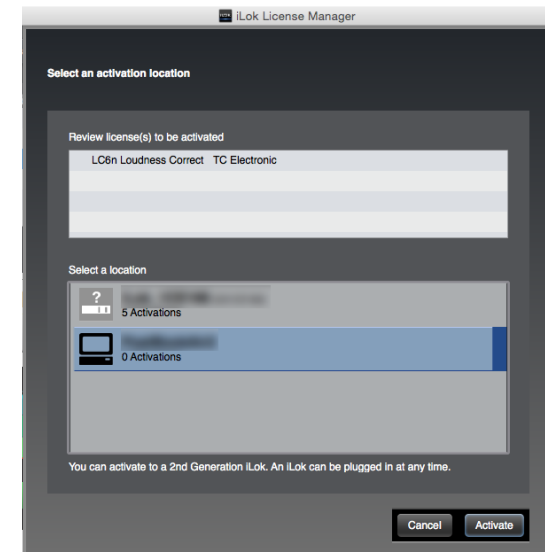*Fig. 5.: Plug-in activation from iLok License Manager*

You will be asked to confirm the activation process.
– Click on "OK" to confirm activation.
 After a few seconds, the activation of your license will be confirmed.
– You can now quit iLok License Manager (this application does *not* have to run while you are using your plug-ins) and continue with the installation of LCn.

Installing LCn

–   Make sure your host software (Pro Tools) is *not* running.
–   Run the installer for the LCn plug-in. You may need an administrator account name and password to run the installer.
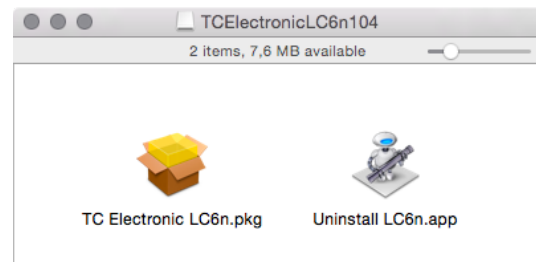–

Fig. 6.: The LCn installer

–   Read and accept the Software License Agreement presented by the installer.
–   Finish the installation of the LCn plug-in and quit the installer.
–   Launch your host software (Pro Tools) to use the LCn plug-in *or*
–   Launch the stand-alone version of the plug-in:
    –   "LC2n Loudness Correct" or
    –   "LC6n Loudness Correct"

Activating your plug-in when launching the host application

–   If you have not activated the recently installed plug-in as described under "Activating your plug-in from the iLok License Manager" on page 6, you will now be presented with a dialog telling you that the plug-in needs to be activated.
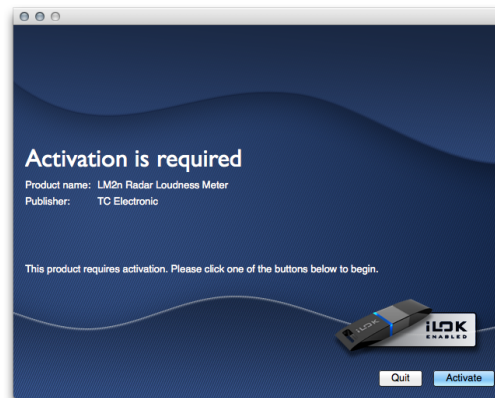
Fig. 7.: iLok Activation prompt in Pro Tools

–   Review the plug-in name, make sure that this is the correct computer to activate and click on the "Activate" button.
–   In the next dialog, select the plug-in you wish to activate and click "Next".
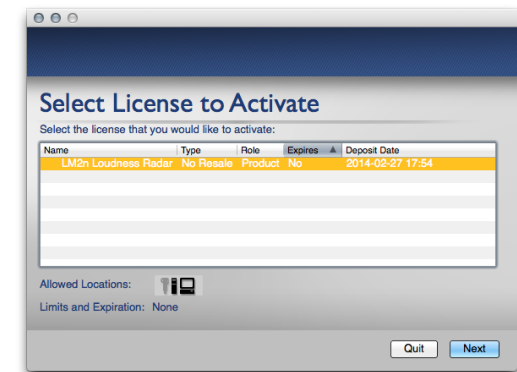
Fig. 8.: Selecting a license to activate

–   In the next dialog, select the activation location (the computer or your iLok 2 device) and click "Next".
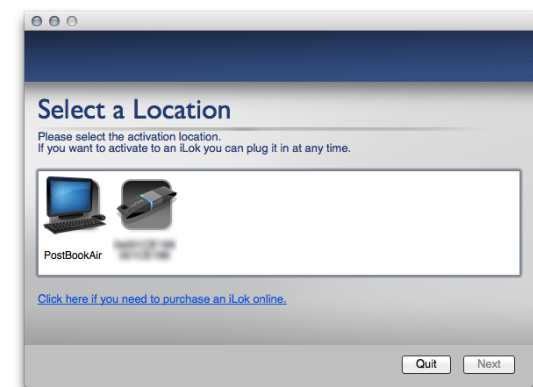
Fig. 9.: Selecting a license location
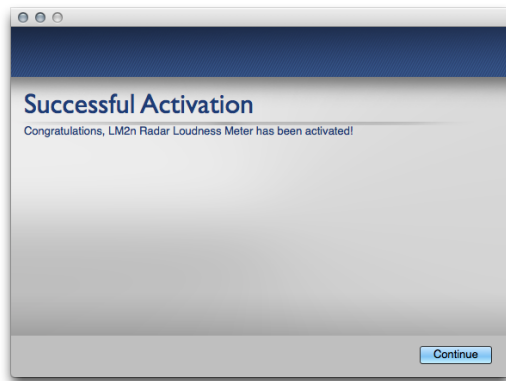
Fig. 10.: Plug-in activation confirmation

– When your host software has finished launch-
ing, the newly activated plug-in(s) will be
available.

Updating LCn

To update LCn to a newer version, just run the in-
staller for the update as described under "Install-
ing LCn" on page 7. The currently installed
software version will be replaced by the new
version. You do not have to activate the plug-in
again after updating.

Using LCn

One-step loudness normalization for your DAW

Whether you deliver for HDTV, Mobile TV, podcast, radio, iTunes, Spotify and/or other modern platforms: **Hitting the right loudness target is essential.** LCn makes this as easy as clicking a button or dragging a file to a folder. These are high-quality plug-ins that will measure and correct the loudness of your tracks.

The plug-in versions of LCn allows you to apply faster-than-real-time, two-pass, off-line processing of your tracks in Pro Tools. In addition, stand-alone versions for Windows and Mac are available. These stand-alone versions have watch folder capabilities, allowing you to simply drag and drop audio files into a target folder for fast and easy loudness normalization and true peak limiting. You can even paste multiple audio files into your watch folder, making the LCn a highly efficient loudness batch processor.

LCn is part of a universal and ITU-standardized loudness control concept, whereby audio may easily and consistently be measured and controlled at various stages of production and distribution. LCn works coherently with other TC equipment or with products from other manufacturers adhering to the same global standard.

LCn features

– **Enjoy precise loudness normalization:** LCn is your shortcut to loudness-normalized audio files, targeted at any delivery platform you could ever think of.
– Integrate **consistent loudness** in your workflow
– Native Pro Tools plug-in versions
– Separate stand-alone versions
– Stand-alone versions offer watch folder capability for **automatic batch normalization of multiple audio files**
– Comes with integrated **mastering-grade Brickwall 2 true-peak limiter**

New in LCn version 1.1

– Watch Folder mode (see "Watch Folder mode" on page 24) has been enhanced. It now has a Start/Stop feature, allowing you to switch batch processing on or off as required.
– Graphical feedback has been enhanced.
– The Target loudness parameter can now be set to a maximum value of -12 LUFS.

Differences between LC2n and LC6n

The only difference between the LC2n and LC6n plug-ins is the number of channels. LC2n is the stereo version, LC6n is the surround version.

Pro Tools and stand-alone versions

LCn is a Pro Tools RTAS/AAX plug-in supporting offline processing. This means that tracks are not processed in real-time, but when initiated by the user.

You can also run the plug-in in a stand-alone version – i.e., without having to use a digital audio workstation. You can drag and drop audio files to the stand-alone version, which will then measure and process these files.

In addition, the stand-alone version has watch folder functionality, which means that it can be set to watch activity in a given source folder. This Watch Folder mode offers various options for deleting source files and renaming destination files if they already exist. For more information, see "Watch Folder mode" on page 24.

Using LCn in Pro Tools

– Install and activate the plug-in as described in "Installation and authorization" on page 4.
– Launch Pro Tools, open your project and select a clip for processing.
– Open Audio Suite > Sound Field >
   LC2n Loudness Correct *or*
   LC6n Loudness Correct
– Click "Analyze" to analyze the selected clip or click "Render" to analyze and process the clip.

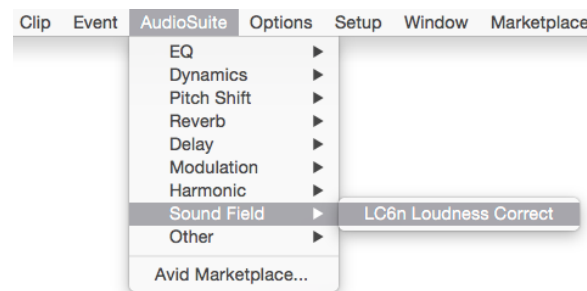| Clip	Event	AudioSuite	Options	Setup	Window	Marketplace
		EQ ▶				
		Dynamics ▶				
		Pitch Shift ▶				
		Reverb ▶				
		Delay ▶				
		Modulation ▶				
		Harmonic ▶				
		Sound Field ▶	LC6n Loudness Correct			
		Other ▶				
		Avid Marketplace...				

Fig. 11.: LC6n in Pro Tools' AudioSuite menu

For more information, see the following chapter: "Interface and feature reference" on page 12.

Using the stand-alone version of LCn

– Install and activate the plug-in as described in "Installation and authorization" on page 4. This will also install the stand-alone version of the plug-in.
– Launch the stand-alone version of the plug-in and select a file for processing by clicking the "Choose" button.
– Click the "Analyze & Process" (or "Auto Analyze & Process") button.
– If the file is compliant, it will be processed, and you will find the processed, loudness-normalized version in the Destination folder (see "Destination folder chooser" on page 22).

If you want to use the stand-alone version of LCn to process all files that you copy or move to a specific folder (often called "batch processing"), you can active Watch Folder mode. For more information, see "Watch Folder mode" on page 24.

Processing of 5.1 surround files in LC6n (stand-alone version)

Please note that the following information only applies to LC6n. LC2n cannot process surround files.

When you use LC6n to process 5.1 surround files that are separated into six separate mono files, LC6n will use Pro Tools naming conventions to determine which file represents which channel. The naming convention is:

Channel	String to append to filename
Left	.L
Right	.R
Center	.C
LFE	.LFE
Left surround	.Ls
Right surround	.Rs

Example: To have LC6n process a surround track called "INTRO" successfully, the files need to be named as follows:
– INTRO.L.WAV
– INTRO.R.WAV
– INTRO.C.WAV
– INTRO.LFE.WAV
– INTRO.Ls.WAV
– INTRO.Rs.WAV

When you add files to LC6n for processing and these files do *not* follow the naming convention described here, they will be seen and processed as mono files.

While the naming convention has to be followed, the *order* in which you add the mono files does not matter.

Interface and feature reference

LCn user interface overview

LCn is available as a native Pro Tools plug-in and as a stand-alone version. While the parameters and processing features for both versions are identical, there are minor user interface differences. In the PDF version of this manual, you can click on a user interface element below to learn more about it.
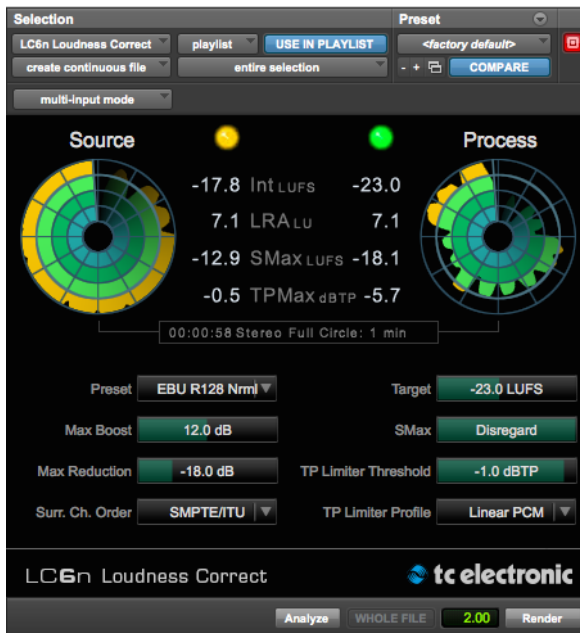

Fig. 12.: LCn – Pro Tools plug-in

Fig. 13.: LCn – Stand-alone version

File chooser
(stand-alone version only)

To select an audio file for processing, click the Choose button on top of the LCn window. A file dialog opens. Select a file for processing and click OK to confirm. The name of the chosen file will be displayed to the left of the button.

Please note that the File chooser will be disabled when you activate Watch Folder mode on the settings page. In Watch Folder mode, you do not select individual files for analysis and processing, but have LCn monitor a folder and process its contents according to the settings on the Settings page. For more information, see "Watch Folder mode" on page 24.

Settings button

To see and adjust LCn plug-in settings, click the Settings button.

For more information, see "LCn settings page" on page 21.

Analyze button

To have LCn analyze the currently selected clip or file, click the Analyze button.

When analysis is started, the Radar Meters are set to an adequate range, so that the loudness landscape for the full clip or file can be displayed.

After analysis, the left Radar Meter will display the short-term loudness landscape for the source clip or file. For more information, see "Source Radar Meter" on page 17.

Analyze & Process (stand-alone) / Render button (Pro Tools)

To have the stand-alone version of LCn analyze and loudness-normalize the currently selected clip or file, click the "Analyze & Process" (or "Auto Analyze & Process") button.

To have the Pro Tools plug-in version of LCn analyze and loudness-normalize the current selection, click the plug-in's "Render" button in Pro Tools.

As the clip or file is processed, you will see the Processed file Radar Meter draw the loudness landscape for the processed clip or file.

After analysis and processing,
– the left Radar Meter will display the short-term loudness landscape for the source clip or file
– the right Radar Meter will display the short-term loudness landscape for the processed clip or file
– *(stand-alone version only)* the processed file will be placed in the folder selected with the Destination Folder parameter on the Settings page.

How processed files are named

If you use the stand-alone version of LCn to process audio files, information about the applied settings will be appended to the destination file names as follows:
– For Program Loudness, the string "INT" and the numerical value is appended to the file name.
– For Loudness Range, the string "LRA" and the numerical value is appended to the file name.
– If the loudness target cannot be met due to plug-in settings, the string "_warning_" is added before the file name.

Naming example
– Name of the source file: "promo.wav"
– Program Loudness: -22.6 LUFS
– LRA: 3.8 LU
– Resulting destination file name: "promo_INT-22.6_LRA3.8.wav"

If a warning is triggered because the Target Loudness setting cannot be met, the resulting destination file name will be:
– "_warning_promo_INT-22.6_LRA3.8.wav"

The leading underscore ensure that these problematic files will be moved to the top of the window in your operating system's file manager (Windows Explorer or Finder) when it is sorted by name.

Radar Meter inspector

The Radar Meter inspector shows the length of the analyzed clip or file and the amount of time that the radar circle represents.

E.g., when analyzing and processing a 45 second clip, the inspector would show:

"00:00:45 Stereo Full Circle: 1 min".

Descriptors

The four pairs of descriptors between the two Radar Meters show essential loudness-related values for the source clip or file (once it has been analyzed) and the processed clip or file (once you have processed the source file).

Source and target Int (Program loudness) descriptors

The Int descriptors show the Program Loudness (or "Integrated Loudness") for the unprocessed and the processed clip or file. Its unit is LUFS. Some vendors and countries use the unit "LKFS" instead of "LUFS", but they are identical: An absolute measure of loudness in the digital domain, where the region around "0" is overly loud and not relevant for measuring anything but test signals. Expect readings of broadcast programs in the range between -28 and -20 LUFS.

Program Loudness is used as a production guideline and to set loudness metadata in delivery if so required. For delivery or transmission of AC3 format, the "Dialnorm" metadata parameter should reflect Program Loudness. The easiest way to handle multiple broadcast platforms is to normalize programs at the station to a certain value, thereby being able to take advantage of the normalization benefits across platforms, at the same time enabling static metadata.

Source and target LRA descriptors

The Loudness Range (abbreviated as "LRA") descriptors show the loudness range of the unprocessed and the processed clip or file as standardized in EBU R128. The unit is LU.

The Loudness Range descriptor quantifies the *variation* of the loudness measurement of a program. It is based on the statistical distribution of loudness within a program, thereby excluding the extremes. Thus, for example, a single gunshot is not able to bias the LRA number.

EBU R128 does not specify a maximum permitted LRA. R128 does, however, strongly encourage the use of LRA to determine if dynamic treatment of an audio signal is needed and to match the signal with the requirements of a particular transmission channel or platform.

Source and target Short Term Max descriptors

The Short Term Max (abbreviated as "SMax") descriptors show the *maximum momentary value* for the unprocessed and the processed clip or file.

Source and target True Peak Max. descriptors

The True Peak Max (abbreviated as "TPMax") descriptors show the maximum true-peak value for the unprocessed and the processed clip or file.

Source Radar Meter

The left radar meter shows the loudness landscape of the source clip or file.

You may already have used other TC Electronic products that employ our famous Radar Meter, such as the LM2n/LM6n plug-ins or the LM6 Loudness Radar Meter in DB6. But even if you don't, you should be able to intuitively understand the dual Radar feature.

The Radar Meter on the left shows the loudness landscape over time (i.e. short-term loudness) of the *original* content. When this clip or file has been processed, the Radar Meter on the right will show the loudness landscape of the new, *loudness-normalized* clip or file. In other words: Pre and Post processing states are displayed simultaneously.

This side-by-side comparison is helpful for all kinds of program types, but it is indispensable when processing long-duration programs, as it allows you to check literally at a glance if everything is in order.

Source "LED"

The round colored "LED" on the left side of the plug-in window shows the status of the source clip or file as follows:

Source "LED" grey
Nothing has been analyzed yet.

Source "LED" green
If the source "LED" is green, the source clip or file has already been loudness-normalized to the same target that you have specified.

Source "LED" yellow
If the source "LED" is yellow, the source clip or file has already been analyzed, but it has not yet been processed (loudness-normalized).

Source "LED" red
If the source "LED" is red, the clip or file you have selected for processing is not in a supported format (AIFF, WAV or BWAV).

Processed Radar Meter

The right radar meter shows the loudness landscape of the processed clip or file. For more information, see "Source Radar Meter" on page 17.

Processed "LED"

The round colored "LED" on the right side of the plug-in window shows the status of the processed clip or file as follows:

Processed "LED" grey
Nothing has been processed yet.

Processed "LED" green
If the Processed "LED" is green, the processed, loudness-normalized clip or file meets your target specifications.

Processed "LED" yellow
If the Processed "LED" is yellow, the settings of some parameters (such as Max Boost, SMax or Max Reduction) have kept the plug-in from hitting the specified loudness target.

Preset drop-down menu

Use the Preset drop-down menu to select the platform and/or region for the processed clip or file. The available options are:
– Default (BS 1770.3)
– ATSC A/85
– ARIB TR-B32
– EBU R128 Normal
– EBU R128 Short Form Cnt
– OP-59
– CD Master
– Film
– Mobile
– iTunes

These presets cannot be modified, and you cannot add user presets.

Max Boost parameter

Use the Max Boost slider to specify the maximum amount of gain that should be added to the signal during processing.

Please note that Max Boost is one of the parameters that may prevent you from being able to hit your loudness target. For example, if you audio clip or file is very soft and you only allow LCn to boost it by, say, 6 dBTP, it might not be possible to reach the specified target.

Max Reduction parameter

Use the Max Reduction slider to specify the maximum amount of gain reduction.

Please note that Max Reduction is one of the parameters that may prevent you from being able to hit your loudness target. For example, if you audio clip or file is very loud and you only allow LCn to reduce it by, say, 6 dBTP, it might not be possible to reach the target specified.

Surr. Ch. Order drop-down menu (applies to LC6n only)

If you use the plug-in to process a 5.1 signal, use the Surr. Ch. Order drop-down menu to specify the order of the channels.

Target parameter

Use the Target slider to adjust the Program Loudness target.

When you select a preset using the Preset drop-down menu, the Target parameter will be set to the required/adequate value – but if you want to hit a different target, you can set a custom target here.

S Max parameter

According to new EBU R128 revisions, there is a recommendation for short-form content such as commercials and promos. Broadcasters can now set a limit for the short-term loudness they want to accept – e.g. -18 LUFS.

When you work with content that is not short-form content, set the S Max slider to "Disregard".

Limiter Threshold parameter

Use the Limiter Threshold slider to set the threshold for the built-in True Peak Limiter. For more information on the True Peak Limiter, see "About the LCn True Peak Limiter" on page 27.

Limiter Profile parameter

Use the Limiter Profile drop-down menu to select a profile for the True Peak Limiter: PCM Linear or AC3 Protect.

Version information

Click the TC Electronic logo to display LCn version information. Click in the version information dialog to dismiss it.
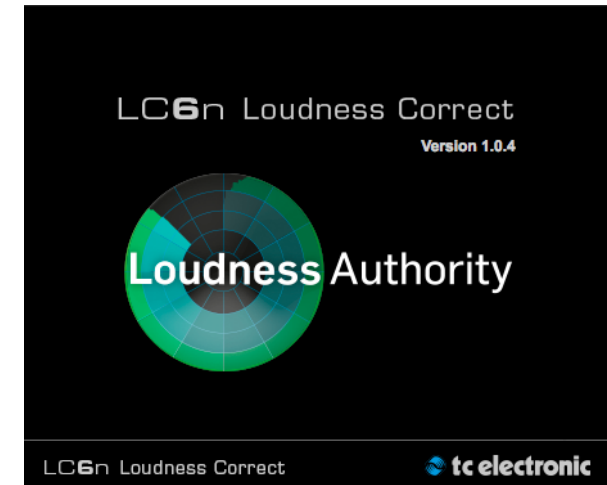

Fig. 14.: LC6n version information

LCn settings page

The parameters shown on the Settings page will change based on the setting of the Watch Folder Mode parameter. For the parameters that are only available when Watch Folder Mode is enabled, see "Watch Folder mode" on page 24.
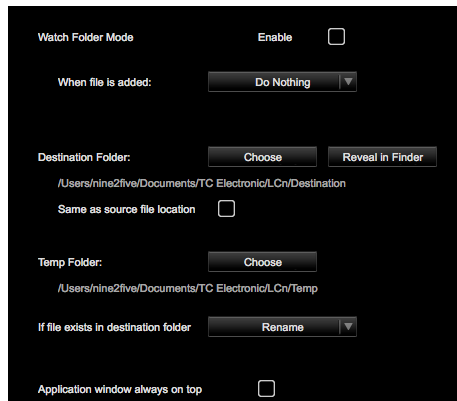

Fig. 15.: LCn settings in File mode (Watch Folder mode disabled)
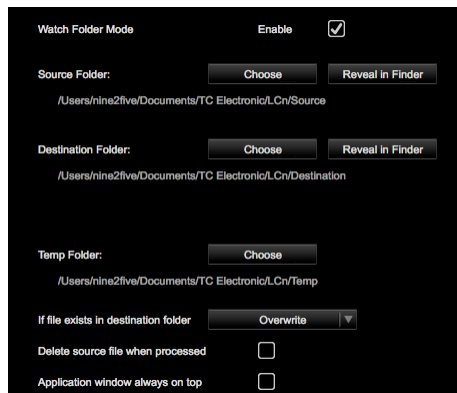

Fig. 16.: LCn settings with Watch Folder mode enabled

Watch Folder Mode parameter

To enable Watch Folder mode, click the Watch Folder mode check box. For more information, see "Watch Folder mode" on page 24.

"When file is added" drop-down menu

This parameter is only available when Watch Folder mode is *disabled.*

To specify what should happen when you have selected a file for processing, use the "When file is added" drop-down menu. The available options are:

– Do nothing
– Analyze
– Analyze and Process

When you set this parameter to "Analyze", the "Analyze" button on the main page will be displayed as "Auto Analyze", thereby indicating that a file will immediately be analyzed when selected or dropped on the LCn user interface.

When you set this parameter to "Analyze and Process", the "Analyze & Process" button on the main page will be displayed as "Auto Analyze & Process", thereby indicating that a file will immediately be analyzed and processed with the current settings when selected or dropped on the LCn user interface.

Destination folder chooser

To specify the folder where LCn should save pro-cessed files, click the Destination folder: Choose button. A file dialog will open, allowing you to se-lect a folder. Click the OK button to confirm the selected folder.

To have processed files saved to the location of the source file, enable the "Same as source file location" check box.

Reveal (destination folder) in Finder/Explorer button

To show the selected destination folder in your operating system's file manager (Windows Ex-plorer or OS X Finder), click the Reveal button. This will allow you to select individual or multiple files for deletion, copying etc.

Temp folder chooser

To specify the folder where LCn should save temporary files during processing, click the Temp Folder: Choose button. A file dialog will open, allowing you to select a folder. Click the OK button to confirm the selected folder.

A temporary folder on your computer's boot drive will be selected by default, but you may want to select a folder on a different drive (e.g. a fast SSD disk) to ensure faster processing, or if there is not enough space left on your comput-er's boot drive.

"If file exists in destination folder" drop-down menu

If you repeatedly process a file with the same settings, you need to tell the plug-in how the resulting naming conflict in the target folder should be resolved by choosing the desired mode from the "If file exists in destination folder" drop-down menu.

Overwrite setting

If you repeatedly analyze and process a file with the same settings, the newest version will overwrite (replace) the existing file with the same name.

Rename setting

If you repeatedly analyze and process a file with the same settings, numbers in brackets will be appended to the file names in the Destination folder:
– "promo_INT-22.6_LRA3.8.wav"
– "promo_INT-22.6_LRA3.8(1).wav"
– "promo_INT-22.6_LRA3.8(2).wav"

Abort setting

If you analyze and process a file and storing it will lead to a naming conflict with an existing file in the Destination folder, the process will be aborted.

"Application window always on top" parameter

Processing large audio files – especially surround files – may take considerable time. If you want to monitor conversion, enable the "Application window always on top" checkbox.

Keeping the window on top also makes it easier to drag and drop files onto it from your computer's file manager (Finder or Windows Explorer).

Watch Folder mode

A key functionality in the LCn stand-alone version is the dedicated watch folder capability.

Using Watch Folder Mode, you can simply drag and drop your audio files into a user-defined target folder for fast and easy loudness normalization and true peak limiting. The new, normalized file will then be saved in a user-defined destination folder. You can also have LCn automatically delete the original file or keep it in the source folder.

Activating Watch Folder Mode

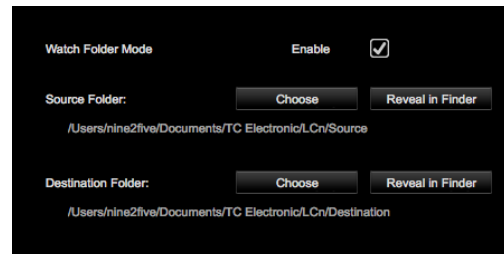To enable Watch Folder mode, click the "Watch Folder mode" checkbox on the LCn settings page.

Fig. 17.: Watch Folder mode enabled

This will replace the "When file is added" parameter by two additional parameters:

Source folder chooser

To specify the folder that LCn should monitor for files that can be processed, click the Source folder: Choose button. A file dialog will open, allowing you to select a folder. Click the OK button to confirm the selected folder.

Reveal (source folder) in Finder/Explorer button

To show the selected source folder in your operating system's file manager (Windows Explorer or OS X Finder), click the Reveal button.

You may want to create a shortcut or alias for the selected source folder on your computer's desktop, allowing you to easily copy/move files to this folder without having to navigate the folder structure.

– In Microsoft Windows, right-click the folder to open the context menu and select "Create shortcut". Move the shortcut to the desktop.
– In OS X, open the context menu for a folder and select "Make alias". Move the alias to the desktop.

Watch Folder mode Start/ Stop button

Activating Watch folder Mode will display a Start/ Stop button on the plug-in's main page.

Fig. 18.: Watch Folder mode enabled, but not started

Click the "Start Watching" button to activate Watch Folder mode.

The button will now read "Stop Watching", and the "Watching…" message is displayed on top of the page.

Fig. 19.: Watch Folder mode enabled and running

Being able to start and stop Watch Folder allows you to activate or pause file processing from the main page without having to switch to settings first.

How files are processed in Watch Folder mode

If you activate Watch Folder mode on the LCn Settings page and move or copy audio files to the specified Source folder, the stand-alone version of LCn will monitor this folder while it is running. When new files are detected, the plug-in will proceed as follows:

If a file can be analyzed, LCn will…
– analyze and process it,
– store the processed (loudness-normalized) file in the Destination folder and then
– move the unchanged source file to the "Processed" subfolder (within the Watched folder) if "Delete source file when processed" has been disabled *or*
– delete the source file if "Delete source file when processed" has been enabled.

If a file cannot be analyzed and processed, LCn will move it to the "Rejected" subfolder in the Watched Folder.

This approach ensures that there are no ambiguities in Watch Folder mode:
– Files that are still in the selected Source folder have not yet been processed, but are queued for processing.
– Files that are moved to the "Rejected" subfolder cannot be processed – usually because they are not in a supported file format.
– Files that are moved to the "Processed" subfolder have been successfully processed. Please note that the "Processed" subfolder contains the original, untouched file, while the processed and renamed version will be saved to the selected Destination folder.

Deleting source files after processing

If you want to have LCn delete files after they have been processed (instead of moving them to the "Processed" subfolder), enable the "Delete source file when processed" checkbox.

LCn will only delete files after they have been successfully processed. Rejected files will not be deleted.

Watch Folder Mode and network shares

Instead of a Source folder on a local hard disk, you can also select a shared folder on a local area network, allowing you to batch-process files contributed by multiple users.

Please note that sending large uncompressed audio files over a network for processing can use considerable bandwidth.

About the LCn True Peak Limiter

True peak limiting is an essential part of normalizing to loudness. TC Electronic has a long history of providing the absolute finest, mastering-grade true peak limiting algorithms, and our legendary Brickwall 2 True Peak Limiter is an integrated part of LCn, complete with true peak limiter profiles (Linear and AC3 Protect) and linking functionality.

Using the True Peak Limiter, you can be absolutely certain that your material will pass the broadcast ingest stage on both loudness and true peak targets and thereby eliminate virtually any risk of having your content rejected.

If you are a broadcaster delivering to multiple platforms such as HD TV and Mobile TV, it is essential to be able to hit two very different loudness targets, typically -23/-24 LUFS and -16 LUFS. In that process a true peak limiter is absolutely key. With the LCn True Peak Limiter handling the peaks, audio quality is kept at its finest – regardless of the delivery platform.

Frequently asked questions

"Why does LCn not support
Audio Units and VST hosts?"
To measure and process signals, LCn requires
two processing passes. Currently, only Pro Tools
supports two-pass signal processing.

Appendix:
Level versus loudness

The path to BS.1770

When level normalization in audio distribution is based on a peak level measures, it favors low dynamic range signatures. This is what has happened to the CD format.

Quasi-peak level meters have this effect. They tell little about loudness and also require a headroom in order to stay clear of distortion. Using IEC 268-18 meters, the headroom needed is typically 8-9 dB.

Sample based meters are also widely used, but tell even less about loudness. Max sample detection is the general rule in digital mixers and DAWs. The side effect of using such a simplistic measure has become clear over the last decade, and CD music production stands as a monument over its deficiency. In numerous TC papers, it has been demonstrated how sample-based peak meters require a headroom of at least 3 dB in order to prevent distortion and listener fatigue.

The only type of standard level instrument that does not display some sort of peak level is the **VU meter.** Though developed for another era, this kind of meter is arguably better at presenting an audio segment's center of gravity. However, a VU meter is not perceptually optimized, or ideal for looking at audio with markedly different dynamic range signatures.

Unlike electrical level, **loudness is subjective,** and listeners weigh its most important factors – **SPL, frequency contents and duration** – differently. In search of an "objective" loudness measure, a certain **Between Listener Variability (BLV)** and **Within Listener Variability (WLV)** must be accepted – meaning that even loudness assessments by the same person are only consistent to some extent, and depends on the time of day, her mood etc. BLV adds further to the blur, when sex, culture, age etc. are introduced as variables.

Because of the variations, a generic loudness measure is only meaningful when it is based on large subjective reference tests and solid statistics. Together with McGill University in Montreal, TC Electronic has undertaken extensive loudness model investigation and evaluation.

The results denounce a couple of Leq measures, namely A and M weighted, as generic loudness measures. In fact, a quasi-peak meter showed better judgement of loudness than Leq(A) or Leq(M). Even when used just for speech, Leq(A) is a poor pick, and it performs worse on music and effects. An appropriate choice for a low-complexity, generic measurement algorithm which works for listening levels used domestically has been known as Leq(RLB).

Combined loudness and peak level meters exist already, for instance the ones from Dorroughs, but BS.1770 now offers a standardized way of measuring these parameters.

In 2006, ITU-R Working Party 6J drafted a new loudness and peak level measure, BS.1770, and the standard has subsequently come into effect. It has been debated if the loudness part is robust enough, because it will obviously get exploited where possible. However, with a variety of program material, Leq(RLB) has been verified in independent studies to be a relatively accurate measure, and correlate well with human test panels. It therefore seems justified to use Leq(RLB) as a baseline measure for loudness, especially because room for improvement is also built into the standard. The final BS.1770 standard included a multichannel annex with a revised weighting filter, R2LB – now known as "K" weighting – and a channel weighting scheme. These two later additions have been less verified than the basic Leq(RLB) frequency weighting.

The other aspect of BS.1770, the algorithm to measure true-peak, is built on solid ground. Inconsistent peak meter readings, unexpected overloads, distortion in data-reduced delivery and conversion etc. have been extensively described, so in liaison with AES SC-02-01, an over-sampled true-peak level measure was included with BS.1770.

In conclusion, BS.1770 is an honorable attempt at specifying loudness and peak level separately, instead of the simplistic (sample peak) and mixed up measures (quasi-peak) in use today. The loudness and peak level measurement engine of LCn follows the standard precisely. Possible updates to the ITU standard may be released as updates to LCn (provided that processing requirements doesn't exhaust the system).

Technical papers from AES, SMPTE, NAB and DAFX conferences with more information about loudness measurement, evaluation of loudness models, true-peak detection, consequences of 0 dBFS+ signals etc., are available from the TC website.

For details, visit the TC Tech Library at tcelectronic.com/tech-library/

Meter calibration

Because of the frequency and channel weighting, and of the way channels sum, only specific tones and input channels should be used for calibration.

The most transparent results are obtained using a 1 kHz sine tone for calibration. Other frequencies or types of signal may be used (square wave, noise etc.), but don't expect similar results. The beauty of the system lies in its RMS foundation, so this is a feature, not an error. The same feature enables the loudness measure to identify overly hot CDs or commercials, and to take out-of-phase signals into account just as much as signals that are in phase.

If we stick to standard methods for measuring peak audio level in a digital system (where a sine wave asynchronous of the sample rate with digital peaks at 0 dBFS is regarded a 0 dBFS tone), BS.1770 and LCn output these results:

– One front channel fed with a -20 dBFS, 1 kHz sine tone: Reading of -23.0 LUFS.
– Two front channels fed with a -20 dBFS, 1 kHz sine tone: Reading of -20.0 LUFS.
– All 5.1 channels fed with a -20 dBFS, 1 kHz sine tone: Reading of -15.4 LUFS.

Display

LCn may use either the measurement unit of **LU (Loudness Units)** or **LUFS (Loudness Units Full Scale).**

LU and LUFS are measurements in dB, reflecting the estimated gain offset to arrive at a certain Reference Loudness (LU) or Maximum Loudness (LUFS) as defined in BS.1770. Since a common reference point for LU has not been agreed on at the time of writing, LUFS (or "LKFS", pointing specifically to the Leq(R2LB) weighting of BS.1770), might be favored initially to avoid ambiguous use of the term LU.

The effectiveness of any loudness meter depends on both the graphical appearance and dynamic behavior of its display, as well as on its underlying measurement algorithms. A short-term loudness meter also relies on the measurement algorithm's ability to output pertinent loudness information using different analysis windows, for instance, 200-800 ms for running real-time updates. It should be noted how the optimum size of this window varies from study to study, possibly because the objective of a running display hasn't been fully agreed upon.

Formal evaluation of a visualization system is challenging: First of all, one or more metrics must be defined by which the display should be evaluated. The correspondence between the sound heard and the picture seen is one aspect to be evaluated. Another metric could characterize the speed of reading the meter reliably.

Postscript

Control of loudness is the only audio issue that has made It to the political agenda. Political regulation is currently being put into effect in Europe to prevent hearing damage and disturbances from PA systems, and to avoid annoying level jumps during commercial breaks in television. In Australia, something similar may happen.

Many years of research into loudness of not only dialog, but also of loudness relating to any type of audio programming, has brought TC to the forefront of companies in the world to perform real-time loudness measurement and control. Therefore, TC has taken active part in loudness standardization efforts in Japan, the United States, Europe and other areas.

In broadcast, digitization is driving the number of AV channels and platforms up, while the total number of viewers remains roughly the same. On the sound production side, it is therefore important that delivery criteria can be easily specified and met, even by people not primarily concerned with audio: Journalists, musicians, video editors, marketing professionals etc.

Using only dialog-based audio measurements in digital broadcast has led to ambiguous level management, more level jumps between programs, and extra time spent on audio production and management in general. Non-dialog based level jumps are currently creating havoc in digital TV, and LCn helps correct that situation.

LCn can be used to control level and improve sound – not only in Dolby AC3-based transmissions, but also on other broadcast platforms, such as analog TV, mobile TV and IPTV.

To summarize:
LCn is part of a holistic and universal approach to loudness control, starting at the production or live engineer. When she realizes the dynamic range at her disposal, less processing is needed at later stages of a distribution chain. The chain ends with the capability of quality controlling everything upstream by applying the same loudness measure for logging purposes: A closed loop.

Welcome to a new, standardized world of audio leveling – across genres, across formats, across the globe.