

greenMachine®



Quick Reference Guide Custom LUT greenMachine titan

Revision 1.2 – Nov 2020

LYNXTechnik AG®
Broadcast Television Equipment

THIS Quick Reference Guide SUPPORTS:	
titan from Revision	862
greenGUI from Revision	2.11.0

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1. Introduction

This quick reference guide provides information related to the greenMachine HDR Static user custom LUT setup and configuration. The greenMachine HDR Static, 1 RU half 19" rackmount, is a real-time broadcast-quality HDR to SDR, SDR to HDR, or cross-standards HDR to HDR converter with frame sync supporting formats up to 4K UHD (3840x2160).

The addition of Custom LUT feature in HDR static allows users to upload their own LUTs to obtain the desired contrast, colour, saturation, black and white levels. This feature provides 20 slots for uploading the user custom LUTs. Users will be able to add, delete and export LUTs using the graphical user interface called greenGUI.

This *Quick Reference Guide* is designed to help you setup greenMachine HDR Static user custom LUTs and provides the step-by-step instruction on its usage.

If you need more information on the HDR Static constellation, then go to the link:
<https://www.lynx-technik.com/products/greenmachine/hdr-sdr-processing/hdr-static-hdr-sdr-converter-for-greenmachine-titan/>

2. Setup requirements

Before setting and configuring the User Custom LUT, ensure the following requirement are met:

1. The greenMachine Titan version used is 862 and above.
2. The greenGUI version installed must be 2.11.0.2894 for Windows and 2.11.0.2343 for MAC
3. The HDR Static constellation is deployed on the greenMachine.

Note: The custom LUT feature is supported on both HDR Static 4K and HDR Static Quad constellations. HDR Static 4K has one 12G processing channel while the HDR Static Quad constellation provides four independent 3G processing channels. At a time, a maximum of 20 Custom Luts can be uploaded on the greenMachine HDR Static. These 20 Custom Luts will be shared among the four processing channels when the greenMachine is configured with HDR Static Quad constellation.

3. Quick-Setup Guide

3.1. Supported File Formats

The greenMachine HDR Static Custom LUT supports the following format for importing and exporting single or multiple LUTs:

File Format	Description
.cube	<p>A cube file is a text file that defines the look-up table. HDR Static uses a 3-dimensional table with the sample points of 33x33x33.</p> <p>If a user wants to import just one LUT on the greenMachine, then the user can choose any 33-point .cube 3-D LUT file.</p>
.xml	<p>The .xml file is an internal LYNX LUT Import and export file that carries the following information:</p> <ol style="list-style-type: none">1. Multiple LUT information (can hold a maximum of 20 LUTs information)2. Parameter settings for each LUT <p>A user can make use of the .xml file to import and export multiple LUTs on a greenMachine. The imported and exported .xml file carries the following information related to each LUT:</p> <ol style="list-style-type: none">1. Input and output Colorimetry2. Input and output Range3. Input and output Transfer characteristics

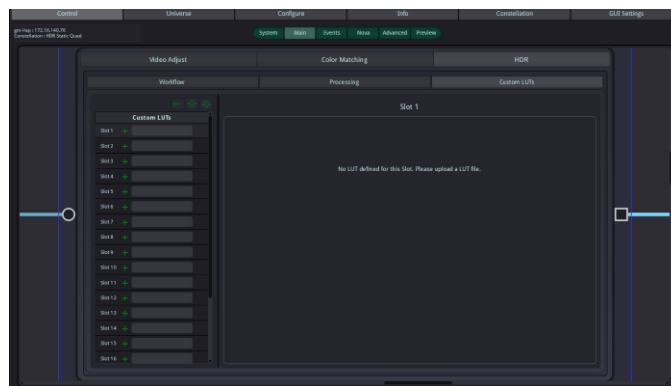
3.2. Uploading Custom LUTs


The HDR Static constellation consists of 20 slots for uploading user custom Luts. Each slot allows storage of one User Custom LUT. Any other LUT file format needs to be converted to “.cube” before uploading it on the greenMachine.

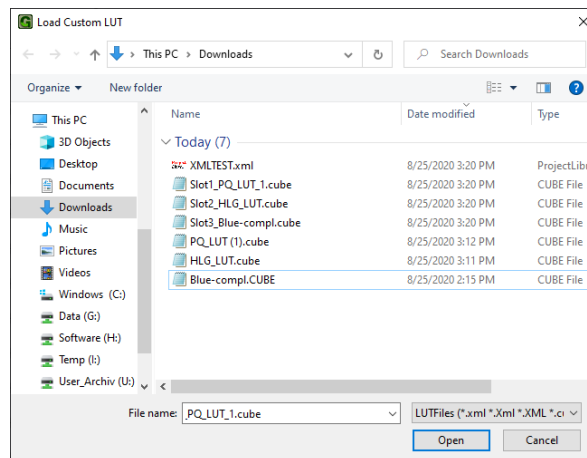
3.2.1.Importing a single Custom LUT

To add a custom LUT on the greenMachine HDR Static, follow the below steps:

Step 1: Go to **Control > Main > Video> Image Proc > Custom LUTs**, the following window will appear:



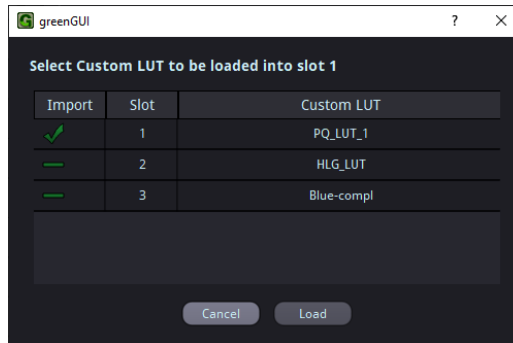
Step 2: Click on  icon corresponding to the slot where the custom LUT is desired. A dialogue box appears for the file selection, as shown below:



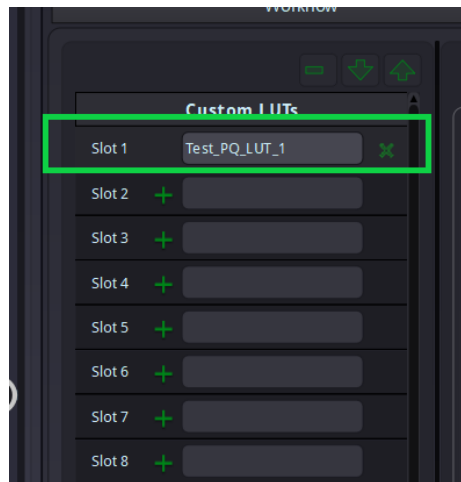
Step 3: Select the “.cube” or “.xml” file for the upload.

Note: A .xml file (previously exported from a greenMachine HDR Static) may consist of multiple custom LUTs. When a user selects a .xml file for adding a custom LUT, a dialogue box will appear that allows the user to select the

desired user LUT from a list. Only one custom LUT can be selected at a time in this process. The dialogue box is as shown below:




Step 4: On successful import of a custom LUT, the selected slot will display the uploaded custom LUT as highlighted below:

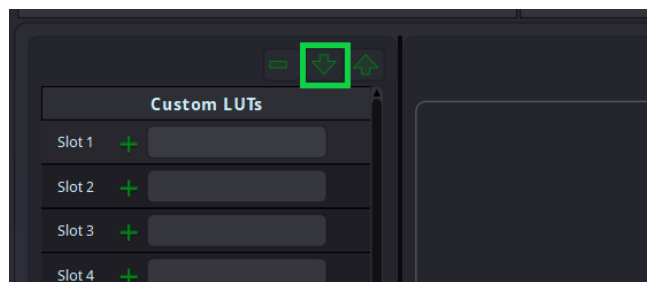


A user can edit the uploaded LUT name by clicking on the Textbox. The maximum allowed characters for the LUT name is 20.

3.2.2.Importing Multiple Custom LUT

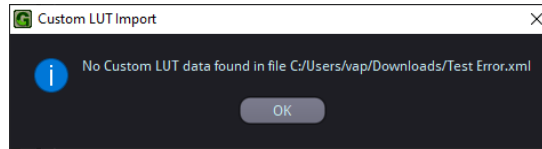
A user can import multiple LUTs by following the below steps:

Step 1: On the **Control > Main > Video > Image Proc > HDR > Custom LUTs** page, click on the  as highlighted below:



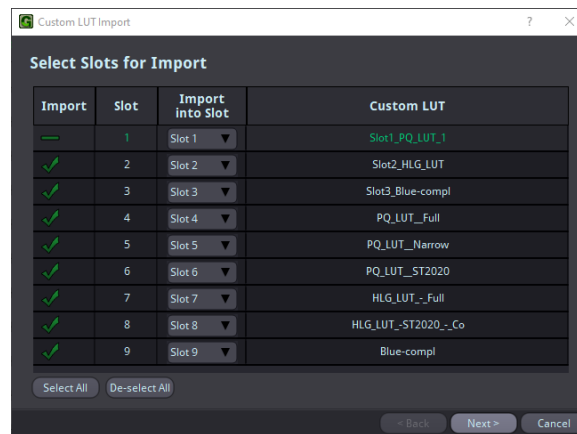
Step 2: On the opened dialogue box for file selection, select the .xml file for upload


Note: The .xml file should be a Lynx User custom LUT file previously exported from an HDR Static greenMachine. Any other file will give an error, as shown below:



To understand how to export custom LUT in .xml file format, check Section 3.5 of this document.

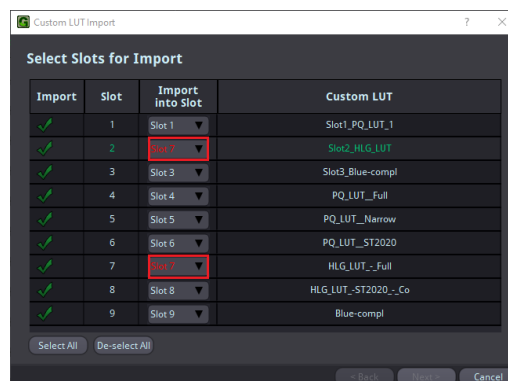
Step 3: A dialogue box is displayed that lists all the Custom LUTs along with their slot number present on the imported .xml file.



A user can select all the LUTs or may choose to pick only those LUTs that the user wants to import. All the LUTs with the icon  will not be imported.

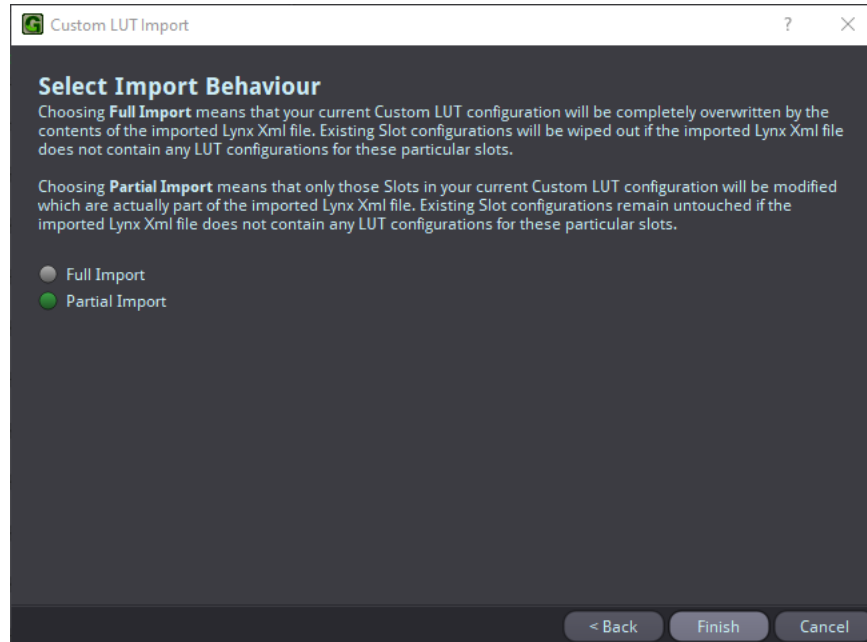
A user can also select the slot number on which the user wants to upload the LUT by choosing the slot from the column “Import into Slot.”

Note: The chosen slot number must be unique within the LUTs slot listed on the .xml file. Any repeating slot number will be highlighted in red, as shown below:



Please note that any existing LUT on the selected slot number in greenMachine will be overwritten when a LUT is imported on the same slot.

Step 4: Click **Next** and the following “**Select Import Behaviour**” dialogue box is displayed



The following table provides a description of the options

Option	Description
Full Import	Select this option when all the existing LUTs on the greenMachine need to be wiped off entirely and updated with newly selected LUTs present on the LUT file.
Partial Import	Select this option when only the selected slots on the LUT file need to be imported. Any existing LUTs on these slots will be overwritten. The remaining slots will be untouched.

Step 5: Click **Finish** to import and complete the import process.

Note: The custom LUT files cannot be uploaded using the greenMachine front panel controls, and additional settings (In and out transfer characteristics, In and Out Range, and In and out color space) are only available on the greenGUI.

3.3. Configuring Custom LUTs

A custom LUT requires configuration of the input and output colour space, range, and transfer characteristics. These settings are required for all the uploaded LUTs.

The following table provides information related to the Input and Output settings of the LUT file:

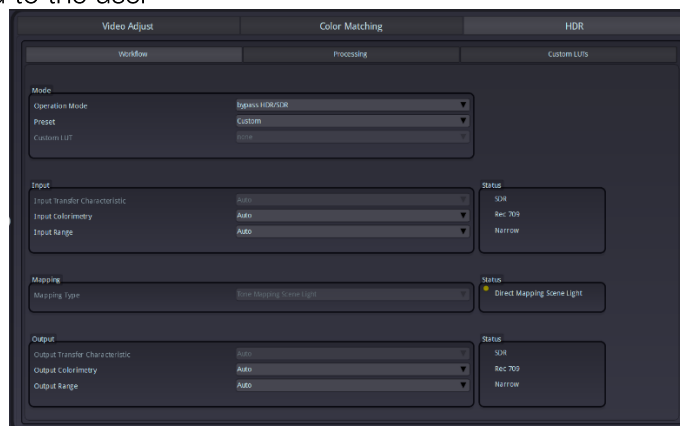
Input	Input Transfer Characteristics	SDR	This information is only required for the input status displayed on the Control > Main > Image Proc > HDR > Workflow page. There is no conversion or processing of any sort.
		HLG	
		PQ	
		Unspecified	
	Input colorimetry	Rec 601	The input colorimeter must be selected correctly to avoid incorrect output. This information will be displayed in the input status on the Control > Main > Image Proc > HDR > Workflow page.
		Rec 709	
		Rec 2020	
	Input Range	No Conversion	This setting allows the preservation of overs/under (Sub black and Super White) in the input signal.
		Auto to Full	In this setting, the range information is automatically fetched from the SDI VPID and converted to the FULL range. <i>Note: In case the SDI range detected in VPID is FULL, there will be no conversion.</i>
		Auto to Narrow	In this mode, the range information is automatically fetched from the SDI VPID and converted to the Narrow range. <i>Note: In case the SDI range detected in VPID is Narrow, there will be no conversion.</i>
		Narrow to Full	In this mode, an SDI Narrow range is converted Full range. <i>Note: In case the SDI input range is entered incorrectly, the output result will be wrong.</i>
		Full to Narrow	In this mode, an SDI Full range is converted Narrow range. <i>Note: In case the SDI input range is entered incorrectly, the output results will be wrong</i>

Output	Output Transfer Characteristics	SDR	This information is required for the SDI output VPID updates and output status displayed on the Control > Main > Image Proc > HDR > Workflow page. There is no conversion or processing of any sort.
		HLG	
		PQ	
		Unspecified	
	Output colorimetry	Rec 601	The output colorimeter must be selected correctly to avoid incorrect output VPID information. This information will be displayed in the output status on the Control > Main > Image Proc > HDR > Workflow page.
		Rec 709	
		Rec 2020	
	Output Range	No Conversion	In this setting, there will be no conversion in the output range.
		Follow Input	In this setting, the output range will be the same as the input range configuration.
		Narrow to Full	In this setting, the output range will be converted from Narrow to Full
		Full to Narrow	In this setting, the output range will be converted from Full to Narrow

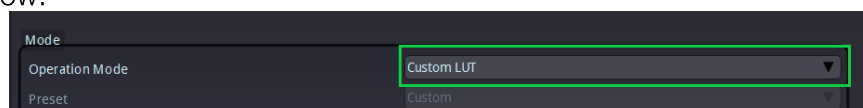
3.4. Deploying Custom LUT

A user can deploy custom LUT on an HDR Static greenMachine by following the below steps:

Step 1: Go to **Control > Main > Image Proc > HDR > Workflow**, the following page is displayed to the user



Step 2: In the **Operation Mode** drop-down list, select **Custom LUT** as highlighted below:



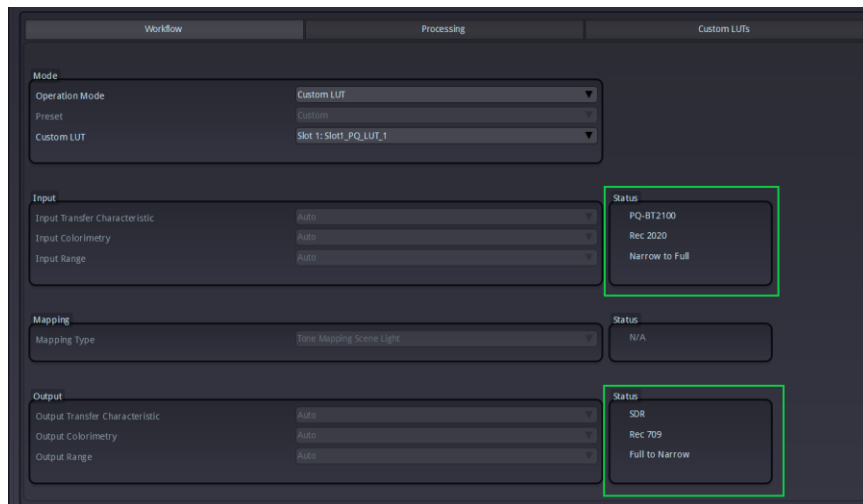
Step 3: In the **Custom LUT** drop-down list, select the desired slot or LUT to be deployed. Once the LUT is selected, this LUT will be deployed.

Note: When a user selects **None** option, then a unity LUT is applied that bypasses the input signal without any processing to the output.

Step 4: A user can check the Input and Output preview on the **Control > Preview** option.

3.5. Viewing custom LUT Status

A user can check the input and output status of a deployed Custom LUT on the **Control > Main > Image Proc > HDR > Workflow page**. The status of the deployed custom LUT can be seen on the Workflow page as highlighted below:

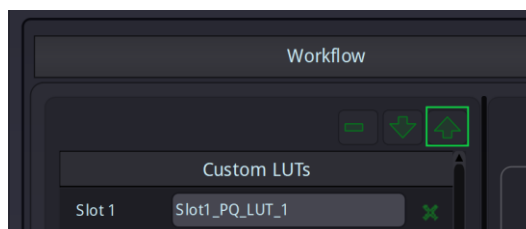


3.6. Exporting Custom LUT

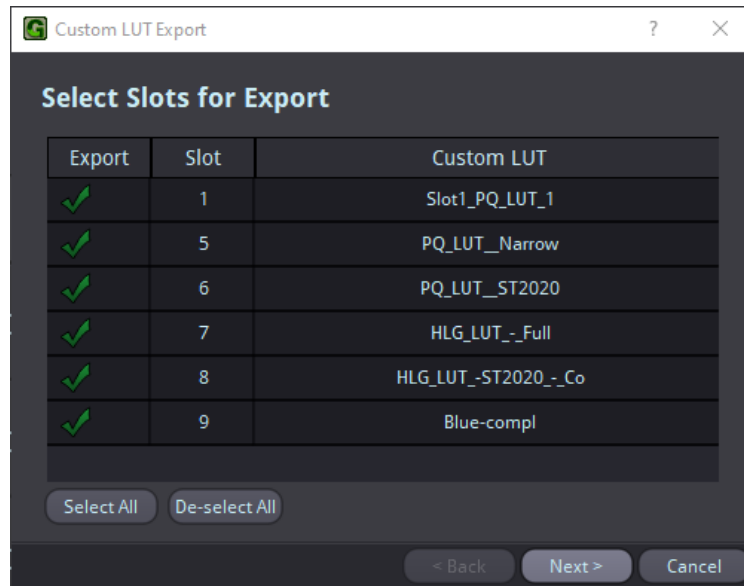
A user can export the Custom LUT on each slot either in .cube format or into Lynx internal .xml format. The .cube format represents one user custom LUT while a .xml file may consist of multiple or a maximum of 20 LUTs. A user can export Custom LUTs from a greenMachine by following the below steps:



Step 1: Go to **Control > Main > Image Proc > HDR > Custom LUTs**

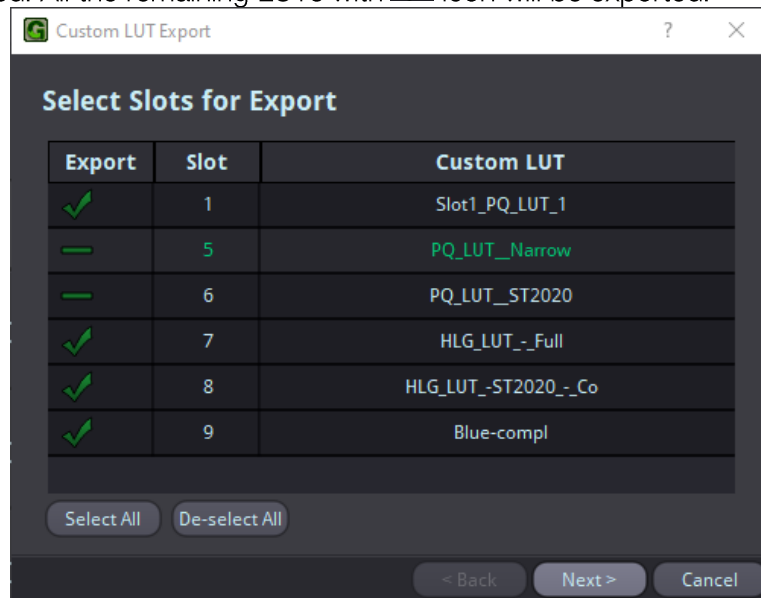
Step 2: Click on the  as highlighted below:



A dialogue box appears on the screens, as shown below:

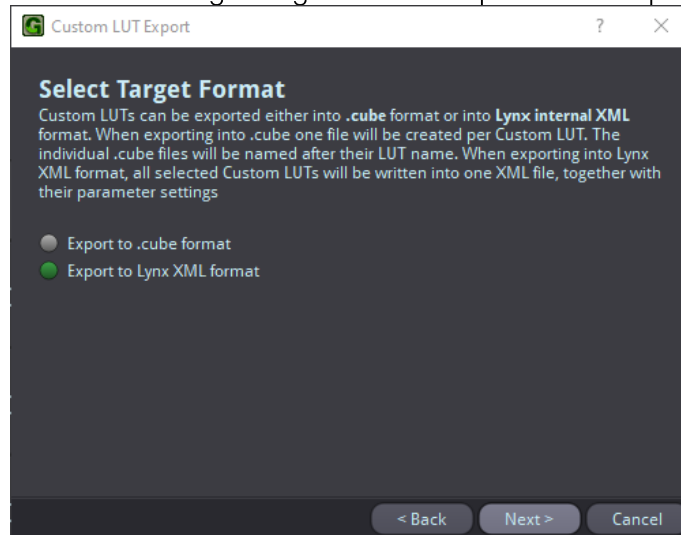


Step 3: The dialogue box will list all the Custom LUTs present on the slots. Empty slots will not be displayed in the list. A user can select all the LUTs that need to be exported or can deselect LUTs that do not require an export. An  icon corresponding to a LUT Slot would indicate that this LUT will not be exported. All the remaining LUTs with  icon will be exported.



A user can also decide to select all the LUTs by clicking on the button "Select ALL" or may choose to deselect all by clicking on the button "De-Select."

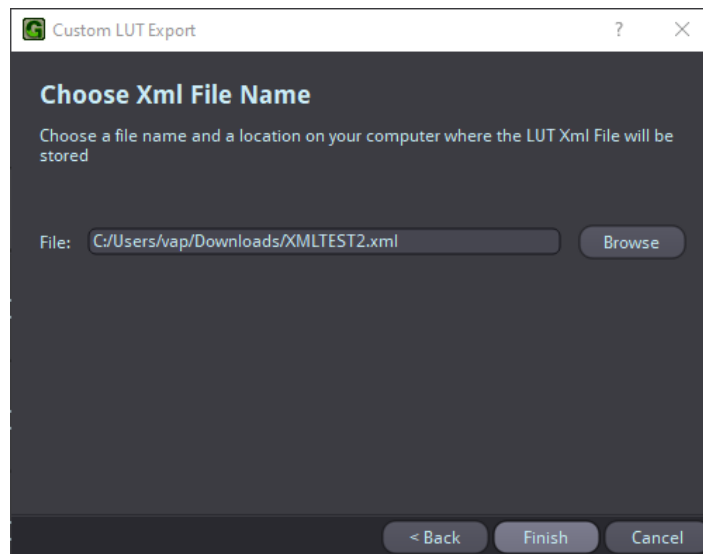
Step 4: Click **Next** and the following dialogue box with options are displayed:



Step 5: Click on “**Export to .cube format**” to export individual LUT file for all the selected LUT slots.

Click on “**Export to Lynx XML format**” to export all the selected LUT files into a single file in .xml format. This .xml file can be imported on other greenMachine to import up to 20 Custom LUTs.

Step 6: Click **Next** and the following dialogue box is displayed to the user




Step 7: For .cube file export, enter the location of the file, and for .xml file export, enter the exported file name and location.

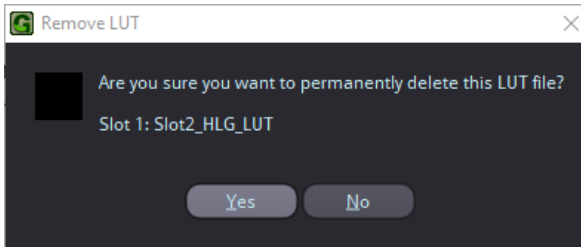
Step 8: Click **Finish** to complete the export process

3.7. Deleting Custom LUT

3.7.1. Deleting a single Custom LUT on a slot

A user can delete a Custom LUT on a slot by following the below steps:

- Step 1: Go to **Control > Main > Image Proc > HDR > Custom LUTs**
- Step 2: Click on the icon  corresponding to the Slot /LUT that requires deletion. A warning dialogue box to verify the selected LUT deletion will appear as shown below:

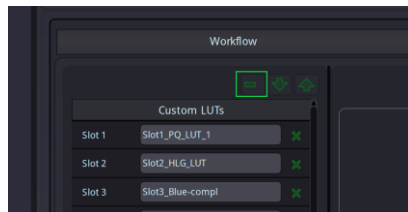


- Step 3: Click **Yes** to confirm the deletion.

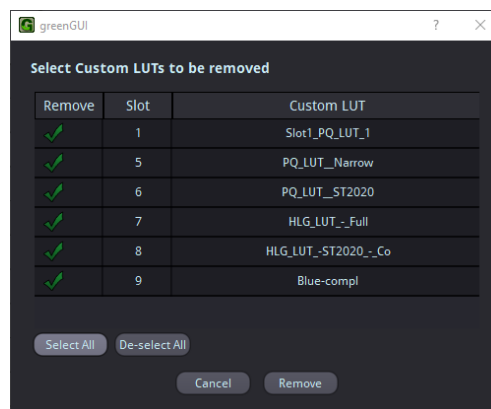
3.7.2. Deleting multiple Custom LUTs

A user can delete all or multiple Custom LUT by following the below steps:



- Step 1: Go to **Control > Main > Image Proc > HDR > Custom LUTs**
- Step 2: Click on  icon as highlighted below:

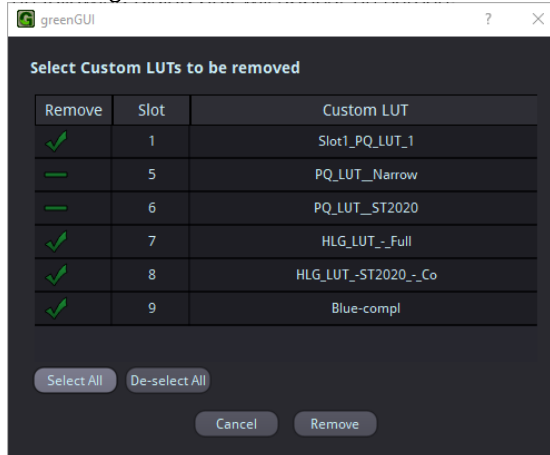


The following dialogue box will appear on the screen:



- Step 3: The dialogue box will list all the Custom LUTs present on the slots. Empty slots will not be displayed in the list. A user can select all the LUTs that need

to be deleted or can deselect LUTs that do not require a deletion. An  icon corresponding to a LUT Slot would indicate that this LUT will not be deleted. All the remaining LUTs with  icon will be deleted.



A user can also decide to select all the LUTs by clicking on the button “Select ALL” or may choose to deselect all by clicking on the button “De-Select.”

Step 4: Click “Remove” to delete or “Cancel” to cancel the deletion process.

Technical Support

If you have any questions or require support, please contact your local distributor for further assistance.

Technical support is also available from our website:

<http://support.lynx-technik.com/>

Please do not return products to LYNX without an RMA. Please contact your authorized dealer or reseller for more details.

More detailed product information and product updates may be available on our website:

www.lynx-technik.com

Contact Information

Please contact your local distributor; this is your local and fastest method for obtaining support and sales information.

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