

Constellation Concept



Revision 1.1 – March 2019

LYNXTechnik AG®
Broadcast Television Equipment

THIS MANUAL SUPPORTS:	
titan from Revision	833
greenGUI from Revision	2.4.0

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Overview

greenMachine adopts a three-prong approach to product definition and function. Rather than being a fixed application specific box, greenMachine is a combination of general-purpose hardware, constellations (pre-defined set of functionalities/features) for re-programmable functionality and powerful control software.

The current greenMachine titan comprises four 3G/HD/SD-SDI video channels or a single 4K/UHD video channel. It offers up to 12G processing support (3840 x 2160 @60 Hz) and provides the functionality to convert between single-link 4K video (12G) and quad-link 4K video (2SI; 4x3G).

The greenMachine titan hardware is a powerful general-purpose audio and video processing appliance that is custom-configured by the user using one of the pre-defined constellations, which can be purchased through the LYNX sales network. It is not limited to one constellation per greenMachine; It may be switched between multiple licensed constellations to configure the machine for many different applications in the workflow.

A Constellation is a template or package of features. When you deploy a constellation on a greenMachine, you are reconfiguring that machine to have those features. Other than some global parameters, only the parameters for that feature set are created.

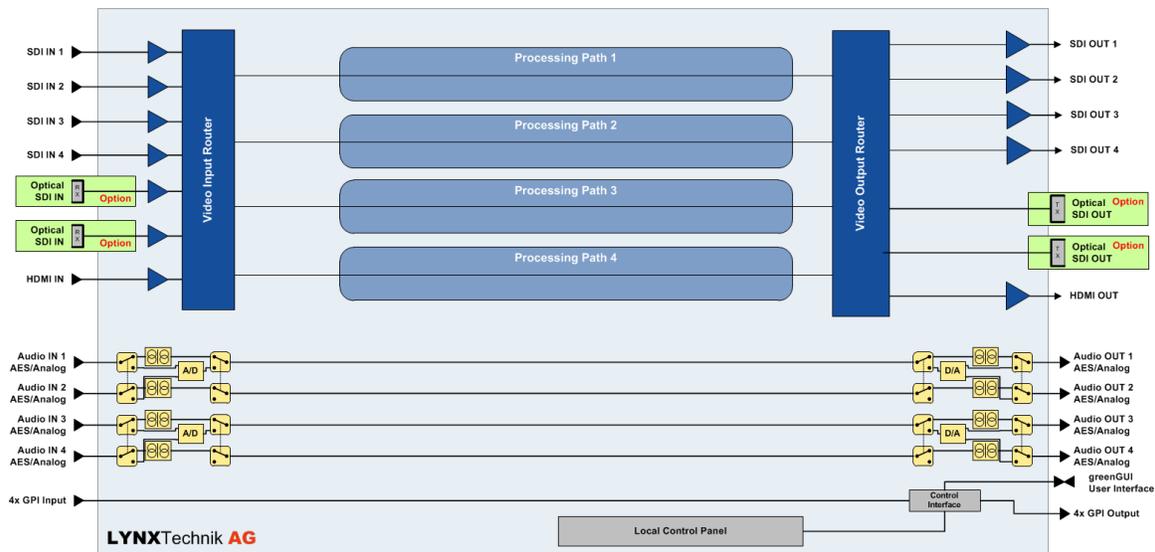
greenMachine hardware devices are standalone processing modules with an intuitive control interface and LCD display for accessing and viewing the graphical menu. The LCD display and menu also allow monitoring of the video inputs and outputs. An entire greenMachine system is fully controlled by the powerful greenGUI® software available for Windows and Mac. This can be downloaded free of charge from the [LYNX website](#) and run in simulation mode to gain an understanding of the system prior to purchase of the hardware.

greenMachine titan Hardware

Four electrical 3G/HD/SD SDI inputs and outputs are available on the greenMachine titan. In addition to this it has an HDMI input and output and two optional fiber inputs and outputs. (Optional SFPs ordered separately) Without any constellations deployed, the greenMachine titan provides an input and output signal router as shown in the functional diagram below. Basic conversion functionality from and to HDMI, SDI and (optional) Fiber are available.

The greenMachine titan comes with four audio input and output connections that can be configured for either analog or digital audio. Basic conversion functionality from and to analog and digital audio are available without any constellations installed. Monitoring of all inputs and outputs including image previews and audio level meters are also part of the basic functionality.

All further video and audio processing functionalities are defined by the deployed constellation.



Functional Diagram 4x 3G configuration

Alternatively, the greenMachine titan can be configured with one 12G capable processing path.

Customizing a greenMachine

The greenMachine titan is supplied as standard with basic routing and audio analog to digital conversion functionalities. All further video and audio processing functions are defined by the deployed constellation.

Constellation

A constellation is a factory configured combination of processing tools such as HDR, FS, UPXD, embedding/de-embedding, timing and color adjustment etc. Constellations define what video and/or audio functionality is present on each processing path. The greenMachine titan has four 3G processing paths or one 12G processing path. When deploying a constellation, it is possible to choose between types for 3G or 12G 4K/UHD.

All current constellations are present in the greenMachine when delivered.

Processing categories are color coded within the control and configuration greenGUI to clearly identify them:

- *Audio I/O* is yellow
- *Sync* is red
- *Video Converter* is turquoise
- *Image Proc* is blue
- *Generate* is green
- *Switching* is gray
- *Monitoring* is cadet blue
- *Global* is magenta

Examples of constellations include:

The *Quad FS* Constellation

- This configures a greenMachine titan into a quad channel frame synchronizer with basic test generator function and video processing, full audio processing including two Dolby E decoders and MADl input and output and automatic, as well as user adjustable audio and video delay.

The *4K UPXD* Constellation

- This constellation provides a broadcast quality 4K/UHD up/down converter with 4x3G Quad Link (2Sl) <> 12G Single Link conversion. It also includes powerful scaling capabilities that allow a versatile Region of Interest (ROI) selection. Additional functions include metadata conversion and assignment as well as video processing, audio processing and shuffle, user adjustable timing delays and a 4K/UHD basic test pattern generator.

Other constellations are available and new constellations continue to be released.

Please check the LYNX website for more information: www.lynx-technik.com

Constellation Deployment

To assign a greenMachine to a particular function simply select and deploy the pre-defined, pre-loaded constellation and apply the required license on that greenMachine. It is possible to change any greenMachine to a different function by switching between licensed constellations at any time without restriction. Licensed constellations will immediately be fully functional.

All current constellations are present in the greenMachine when delivered. New additional (unlicensed) constellations can be acquired as they are published as an integral part of the greenMachine firmware updates from the LYNX Technik website. Registered users will be notified by email when updates are available. All constellations can be deployed for full functional testing even without a license, with all parameter adjustments and signal processing, but unlicensed constellations will show a watermark on the video output. (Unlicensed watermarking shown below)

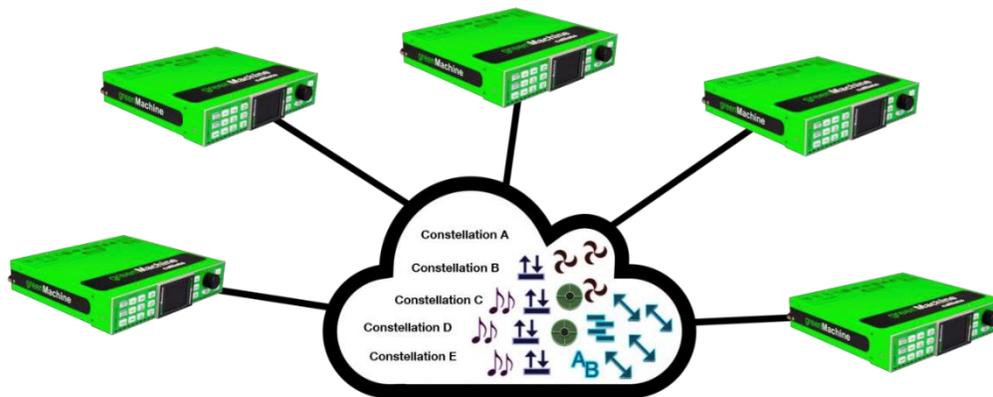


Watermark video output on a TESTOR test pattern

The audio channels embedded in the output video and the external audio channels will also be watermarked with a 1 kHz test tone every 20 seconds.

greenUniverse

When two or more greenMachines are connected in the same control network with a PC or Mac running greenGUI (over an existing Ethernet network), they form a “greenUniverse.” This Universe enables the greenMachines to share and transfer information, such as constellation licenses and stored user generated images/patterns in the TESTOR constellation.



A greenUniverse - greenMachine cloud with five greenMachines

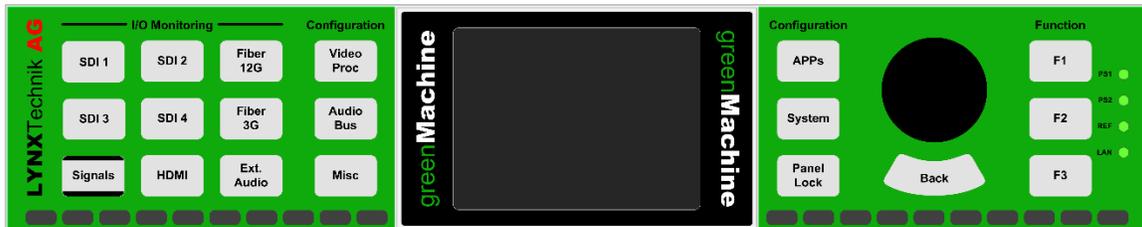
When a license is purchased it is available for use on any greenMachine within the a greenUniverse. Purchasing a constellation license from LYNX activates one instance of that constellation in any greenMachine at any given time. If several instances of the constellation are required at the same time, additional licenses must be purchased. If a given constellation is required at several different points in the greenUniverse but at different times, only one license is needed as it can be moved through the greenUniverse via the control network to other greenMachines.

A good example of this is the TESTOR constellation. Although a generated test pattern may be required at every output of all greenMachines in a Universe, it is unlikely that they will all be needed at the same time. In this case a license can be moved between greenMachines through the control network, deploying it where and when required to a greenMachine needing a generated test pattern output. More than one TESTOR license will be required if several instances are required simultaneously. When a given Constellation is deployed in greenMachine, the control system will check if there is an available (unassigned) license in the greenUniverse. If so, the license will be assigned to the greenMachine being configured. If not, as described above, a watermark will be present on the outputs until the required constellation license is purchased. It may also be possible to release a constellation license from any other greenMachine in which that constellation it is not currently being used.

Deploying Constellations with the local Control Panel

The front control panel allows the complete configuration of the greenMachine module including the deployment of constellations.

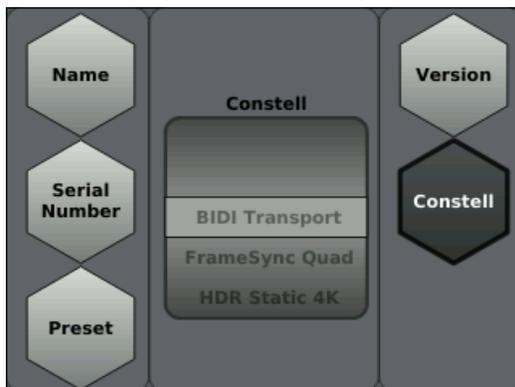
Deployment of constellations can be done in the *System* menu. To select the *System* menu, just press the button next to the display. Then select the *General* menu.



Note: The areas on the left and right side of the display show the active menu items. Turning the rotary push encoder will navigate between these different menu items. The inverted menu item (i.e. dark gray with white text) is currently selected.

There are two different shapes for the menu items. The square boxes are menus containing at least one additional menu level. When selected, the middle part of the display will show a preview of which settings and/or menus are available within this menu. Pressing the encoder will enter the selected menu. Pressing the Back button below the encoder will return to the higher menu level.

Select the constellation you would like to deploy from the list in the display and press the rotary button.



Note: The hexagon shaped items are parameters. When one of these menu items is selected, the middle area of the display will show the type of parameter and the current setting.

To edit the parameter, press the encoder. When in edit mode, turn the encoder to select the setting required. To exit the edit mode, press either the encoder or the Back button.

Deploying Constellations with the greenGUI

The greenMachine can be used as a stand-alone module or it can be fully controlled by the greenGUI Windows and Mac desktop application. When part of a greenUniverse, each greenMachine can also be configured locally.

The greenGUI software is supplied as part of the greenMachine package, and can be downloaded free of charge from the [LYNX website](#). greenGUI control software is a comprehensive, centralized application which provides remote control and status monitoring and event (error) reporting for all modules installed in a greenMachine or greenUniverse system.

Universe Editor

The greenUniverse encompasses everything. It graphically depicts all greenMachines in the designated control network. The universe offers a zoomable and pannable view.

Each greenMachine in the universe contains a flexGUI to control all the processing parameters within the constellations.

The universe has access to all machines and all their parameters. Selecting a greenMachine in the Rolodex (scrolling menu) will cause the universe to zoom into that machine. Double clicking on a machine in the universe graphic will bring focus in the Rolodex.

On the right hand side of the Universe Editor you will find a Rolodex with all the Constellations available in the greenUniverse (see picture below). These are the templates that you can use to reconfigure your machine. The constellation rolodex does not display or contain any machine specific information. To deploy a Constellation onto any greenMachine, just select it from the Constellations Rolodex, and drag and drop it on to the greenMachine.



Selecting a Constellation for Deployment

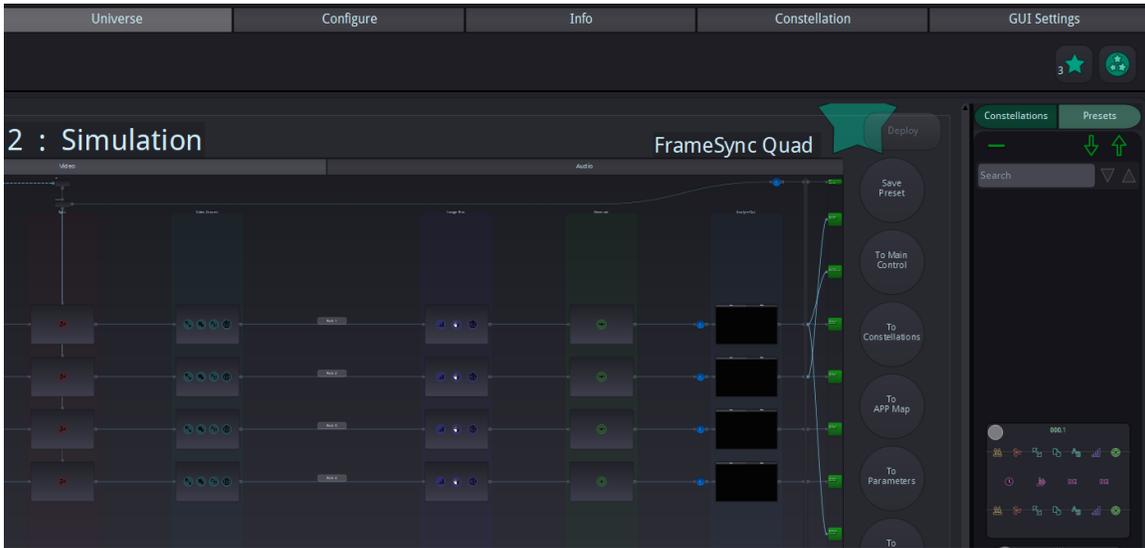
The greenMachine will then have a thick blinking colored border and the Deploy button on the top right of the Universe canvas will also be colored (see image below). If the required license has been purchased, the border and the Deploy button will be green and the Deploy button can be clicked to finalize the license installation. If a constellation licensed is not available in the greenUniverse, the border and the Deploy button will be red. This red color warns you that on deployment, the outputs of this greenMachine will be watermarked, and/or that a license needs to be released or purchased.



Deployment confirmation of a Constellation

Presets

A Preset is a snapshot of all the parameters available on a greenMachine. The collection of parameters will vary, depending on the currently deployed constellation. A preset does not contain any machine specific information, it only knows parameters.



Constellation Licensing

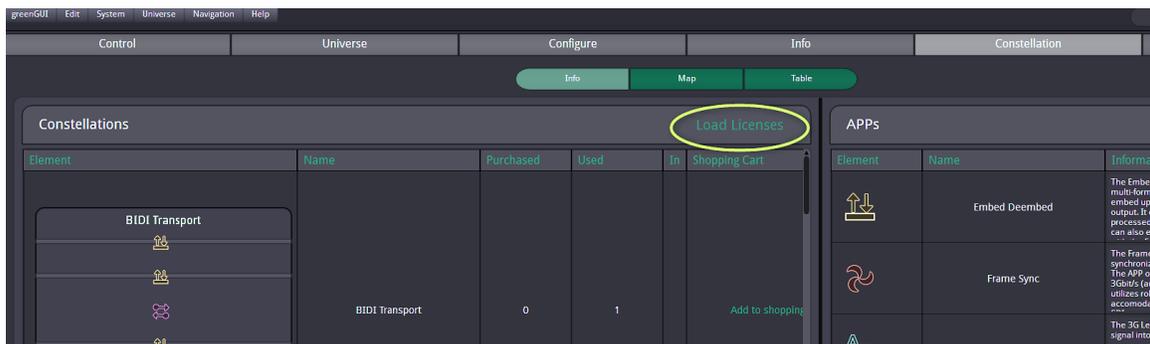
A greenMachine serial number is necessary to buy a constellation license. The license is loaded into the greenMachine with this specific serial number. This machine is now the “owner” of the license.

Licenses are shared in the universe. If the original owner of license A for Constellation A, gets Constellation B deployed, license A is now available for a different machine to use. If a different machine deploys Constellation A, it will take license A away from the original machine. When license A is no longer needed on the other machine, for instance, Constellation C with license C is deployed, license A moves back to the original owner. If the original machine is not currently in the network at that time, the license will remain with the other machine. When the original machine comes back into the network the license will automatically move back to the original owner.

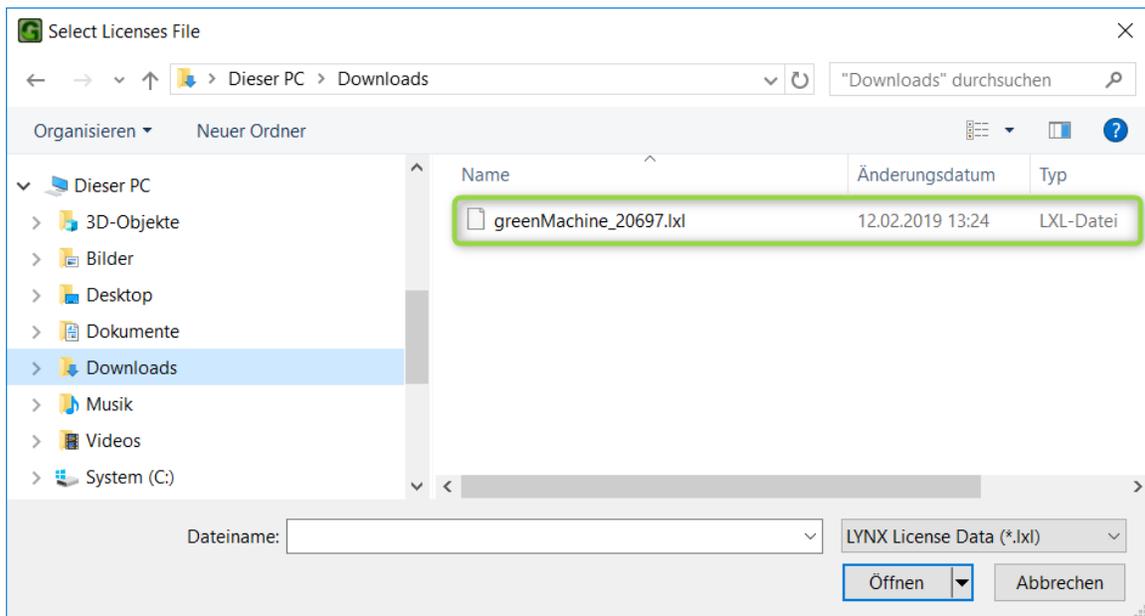
When a greenMachine, which has licenses is powered down or removed from the network, its licenses are not available anymore. You can export the licenses to another greenMachine before doing this, using the export dialog in the Constellation-Map page. A new serial number must be provided, so the owner of the license can be changed.

Load Additional Purchased Licenses

When an additional constellation license is required it must be purchased from [your local LYNX representative](#). The license will be sent via e-mail as an attached .lxl file and can be stored in a folder of your choice on the greenMachine control-network computer running greenGUI. Then simply open greenGUI and click on the “Load Licenses” button in the Constellation Info tab (see below) and it will be added to the ‘Purchased’ and ‘Unused’ Licenses columns, ready to deploy to the greenMachine of choice.



A window will pop up where you can select available license files (filename.lxl).



Select the required license file (filename.lxl) and “open” it.

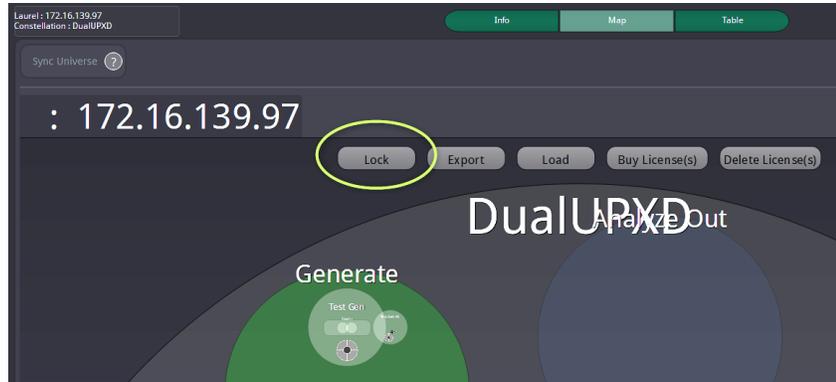
Note: The serial number of the connected greenMachine must match with the serial number in the license file

Locking

There are two types of locking in the greenGUI

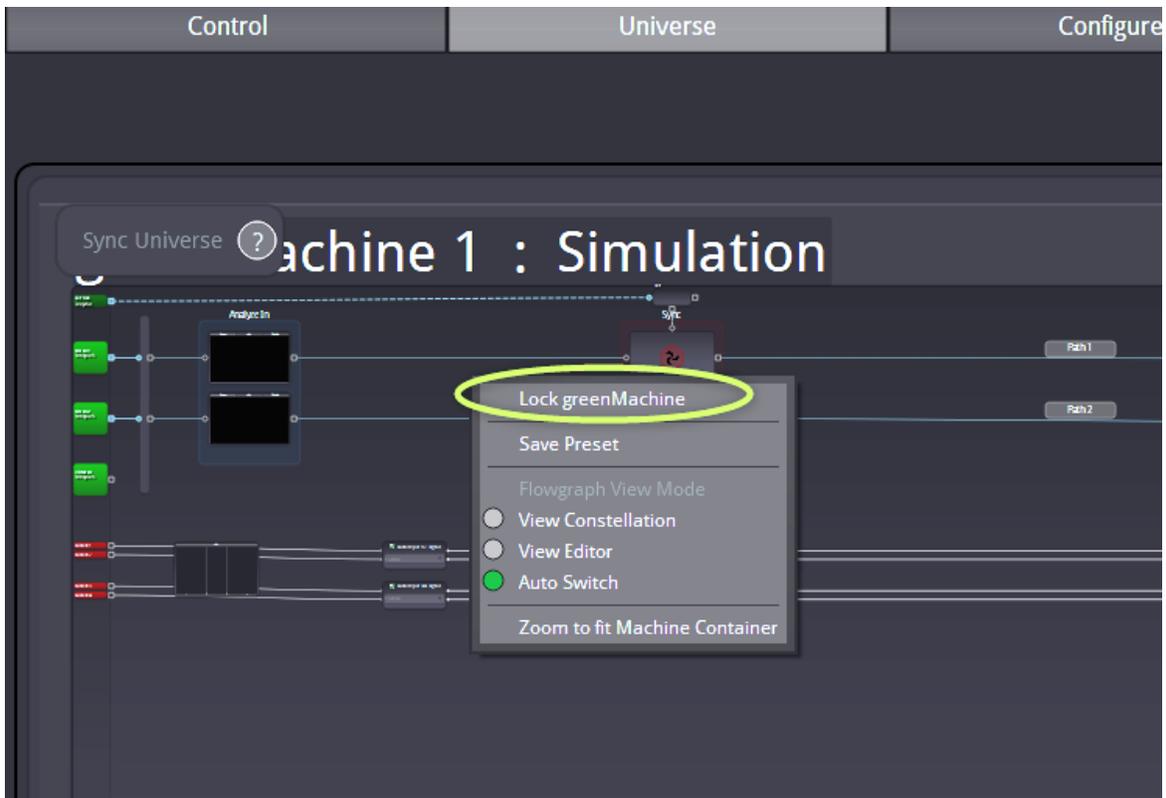
License Lock

This form of locking is performed in the Constellation Map subpage. When the lock is on, it takes the machine out of license sharing, meaning it will not give up a license even if it is not using it.



Machine Lock

This form of locking can be activated from the context menu of a selected greenMachine in the Universe View. To open the context menu just right click into the view of the respective greenMachine. It locks the current constellation configuration in the machine, meaning it is not possible to deploy a different constellation onto it.



Nova Controller

The NOVA controller is included in every constellation and enables the user to add full SNMP v2 as well as LYNX IP remote control protocol. If the computer where the greenGUI is running has the possibility to connect to several Networks, the *Network* Subpage will enable the user to select in which of these Networks the greenMachines are located.

CustomControl

This enables the user to design customized control panels for a PC, Mac or iPad, giving simplified direct access to user selected parameters. CustomControl is particularly useful in live environments where instant access to a regularly used set of parameters is required without the distraction or risk of accessing all the system settings. To find more information about this powerful and convenient CustomControl feature, please watch the video at <http://www.lynx-technik.com/en/products/appolo/customcontrol/>.



CustomControl
CustomControl operators screen



creationscreen

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 web site:

www.lynx-technik.com

Contact Information

Please contact your [local distributor](#); this is your local and fastest method for obtaining support and sales information.

LYNX Technik can be contacted directly using the information below.

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LYNX Technik manufactures a complete range of high quality modular interface solutions for Broadcast and Professional markets. Please contact your local representative or visit our website for more product information.

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